PRESENTED

Bulletin of the British Museum (Natural History)

Seaweeds of the western coast of tropical Africa and adjacent islands: a critical assessment. IV. Rhodophyta (Florideae) 2. Genera G

James H. Price, David M. John and George W. Lawson

Botany series Vol 18 No 3 29 September 1988

SHOUT
SHARE
IT

The *Bulletin of the British Museum* (*Natural History*), instituted in 1949, is issued in four scientific series, Botany, Entomology, Geology (incorporating Mineralogy) and Zoology, and an Historical series.

Papers in the *Bulletin* are primarily the results of research carried out on the unique and ever-growing collections of the Museum, both by the scientific staff of the Museum and by specialists from elsewhere who make use of the Museum's resources. Many of the papers are works of reference that will remain indispensable for years to come.

Parts are published at irregular intervals as they become ready, each is complete in itself, available separately, and individually priced. Volumes contain about 300 pages and several volumes may appear within a calendar year. Subscriptions may be placed for one or more of the series on either an Annual or Per Volume basis. Prices vary according to the contents of the individual parts. Orders and enquiries should be sent to:

Publications Sales,
British Museum (Natural History),
Cromwell Road,
London SW7 5BD,
England.

World List abbreviation: *Bull. Br. Mus. nat. Hist.* (Bot.)

© British Museum (Natural History), 1988

The Botany series is edited in the Museum's Department of Botany

Keeper of Botany: Mr J. F. M. Cannon
Editor of Bulletin: Mr J. R. Laundon
Assistant Editors: Dr A. J. Harrington and Miss M. J. Short

ISBN 0 565 08021 0
ISSN 0068–2292

British Museum (Natural History)
Cromwell Road
London SW7 5BD

Botany series
Vol **18** No 3 pp 195–273

Issued 29 September 1988

- 4 OCT 1988
PRESENTED
LIBRARY

Seaweeds of the western coast of tropical Africa and adjacent islands: a critical assessment. IV. Rhodophyta (Florideae) 2. Genera G

James H. Price

Department of Botany, British Museum (Natural History), Cromwell Road, London SW7 5BD

David M. John

Department of Botany, British Museum (Natural History), Cromwell Road, London SW7 5BD

George W. Lawson

23 Sheffield Terrace, London W8 7NQ

Contents

Synopsis 195
Introduction 195
Species list 197
Acknowledgements 255
References 255

Synopsis

This paper assembles and, so far as is possible without extended field and herbarium studies, examines critically the validity of records of marine and brackish-water Rhodophyta (Florideae) for the western coast of tropical Africa. The whole mainland coastline from the northern boundary of Western Sahara southwards to the southern boundary of Namibia, the oceanic islands from the Salvage Islands southwards to Ascension and St Helena, and all islands close to the African mainland are included in the area covered. Each species entry includes all traced records for the species, the names which have previously been applied to it for the area, and additional comments or evaluation, as necessary. Comments are also provided at generic or generic group levels in very complex cases. One new combination is effected: *Polycavernosa domingensis* (Kützing) J. Price & D. John (*Sphaerococcus Domingensis* Kützing).

Introduction

The area dealt with in this part of the work is identical with that covered in parts published previously (Lawson & Price, 1969; Price, John & Lawson, 1978, 1986; John, Price, Maggs & Lawson, 1979). Country names employed and their earlier equivalents, and the names of island groups included, are either listed in the legend or both listed and shown on the map in Fig. 1. Genera with the initial letter G and constituent species are listed in alphabetical order; space and organisational requirements within the *Bulletin* have required subdivision of a text originally intended to cover as one issue all the remaining genera for the Rhodophyta (Florideae).

Each main entry consists of:

(i) *The major bold heading*, representing the currently-accepted name and authorities.

(ii) *Subsidiary italicised headings at intervals within the entry*. These are in square brackets and essentially subdivide the overall entry. They represent the different ways in which the species has been referred to throughout the past publication patterns for the area. Incorrect citations from past literature have been maintained in these subsidiary heads so that there shall be no doubt as to which record we attribute to which species or lower

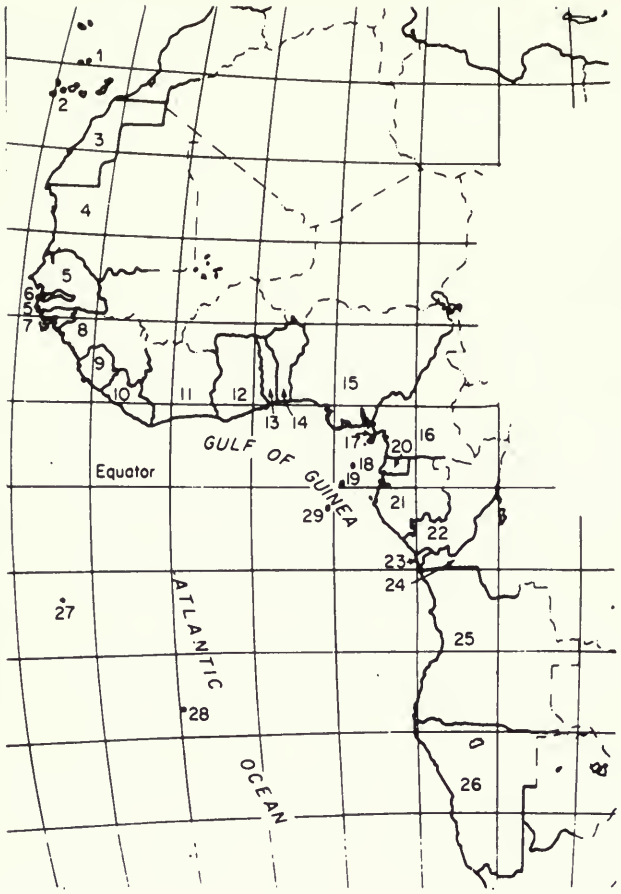

Fig. 1 The coastline of tropical west Africa and the offshore islands.
1, Salvage Islands; 2, Canary Islands; 3, *Western Sahara [= former Spanish Sahara, Spanish West Africa] (includes the often quoted Rio de Oro, the southern region of the country, but excludes Ifni); 4, Mauritanie; 5, Sénégal; 6, Gambia; 7, Guinea-Bissau [= Portuguese Guinea]; 8, Guinée; 9, Sierra Leone; 10, Liberia; 11, Côte d'Ivoire; 12, Ghana; 13, Togo; 14, Benin [= Dahomey]; 15, Nigeria; 16, Cameroun; 17, † Bioko [= Macias Nguema Biyogo, Fernando Póo]; 18, Príncipe; 19, São Tomé; 20, † Equatorial Guinea [= Spanish Guinea]; 21, Gabon; 22, ‡ Republic of the Congo; 23, Cabinda; 24, Zaire [= Congo Republic]; 25, Angola; 26, Namibia [= South West Africa]; 27, Ascension Island; 28, Saint Helena; 29, Pagalu [= Annobón]. The Cape Verde Islands, which lie immediately to the west of Dakar (Sénégal), have been omitted from this map but are included in the species list that follows.

* The former colony of Spanish Sahara no longer officially exists, the territory it once covered being divided, by agreement, between Morocco and Mauritanie. The effective date of the division, Spain concurring, was 28 February 1976, although guerrilla opposition delayed matters until a formal agreement on 14 April 1976. The attempt to maintain the territory as the Democratic Sahara [Saharan] Arab Republic has apparently entered the 'realm of myth' (Gretton, 1976).

† Nos 17 (Bioko) and 20 (Spanish Guinea, = Rio Muni) on the original map (part I) are now jointly administered, with Annobón (29), as Equatorial Guinea. Bioko and Annobón are entered separately, where appropriate, in the species list.

‡ Loango, a name much used by earlier collectors such as Welwitsch, was formerly a coastal region of West Africa. Its application appears to have included much of the coastline of the Republic of the Congo (22), as well as of Cabinda (23) and Zaire (24). Because by far the longest and rockiest part of the Loango coast lies now within the Republic of the Congo we have attributed all marine algal records from Loango to the Congo.

taxon level; only when clarification was required for comprehension have changes been made in sub-head citation, in which case explanation is given in intermediary or terminal notes.

(iii) *The distributional data*, with countries and island groups arranged in a single alphabetical order. More generalised but still relevant statements of distribution follow the specific country list. Complete distribution patterns require a scan of records established under *all* names by which a species is known for this or adjacent areas. Hence, generalised distribution statements are included verbatim since it is not always clear for precisely which countries within the area they establish records. In all these cases, countries/islands/generalised statements, numbers within parentheses after the names refer to corresponding numbers in the references. In the present reference list, for ease of readjustment for subsequent parts, references have not been renumbered but simply omitted or added terminally and additionally numbered as appropriate for the present part. Again, lists of references are therefore only partially interchangeable between different parts of the overall list. As in 1986, we have considered the alphabetical sequence of authors' names to be of greater importance than the strict numerical sequence. References therefore appear in alphabetical order but only cross-referred as to numerical order, where there is an anomaly for various reasons of rearrangement or addition. 'References' in the listing cover also manuscript and expeditionary sources, as well as works currently in press.

(iv) *Additional qualifying notes*, intermediary or terminal, have proved to be required in many cases. These notes appear below whole entries or individual parts of entries to which they specifically refer. Citation of references in the notes depends for its form on whether those references contain species records (when they consist of authors' names, followed by the reference number in the terminal list and, where appropriate, the relevant page numbers after a colon) or do not (when they consist of authors' names, date of publication, and sometimes page numbers after a colon).

Species nomenclature has been revised as far as possible and the complete author citation is given for each currently-accepted combination. The subsidiary italicised headings (and any other discarded combinations that require reference in the context of records of accepted species for the list area) are included as cross-referencing entries to the currently-accepted names in the overall list. The necessarily preliminary nature of all parts of the treatments presented has been emphasised for each previously-published part of the list and applies no less here. As indicated in previous parts, critical updating of the overall text is kept firmly in mind for the whole work, although feasibility of that process will remain the final determinant at the appropriate time. We would appreciate notification of any detected errors and omissions from any of the parts.

Species list

Galaxaura

The complexities of taxonomy/nomenclature in this genus have long been recognised, although resolution of the problems still leaves much to be desired. Complexities have been hitherto compounded by a general tendency to apply different epithets to plants later recognised as tetrasporic and gametophytic generations of the same life-history. The anatomy exhibited by these different life-history stages is occasionally sufficiently dimorphic for some species to be entirely misunderstood and the different stages thus to be placed in separate anatomically-distinguished sections of the genus (cf. Howe, 1917, 1918; Cordeiro-Marino, 108; Papenfuss et al., 436) – examples are *G. obtusata* (gametophyte hitherto placed in Spissae*, tetrasporophyte in Cameratae*) and *G. marginata* (gametophyte in Vepreculae*, tetrasporophyte in Brachycladia*).

The major earlier work on this genus, that of Kjellman (313), has been subject to major

* Sensu Chou (103), Spissae = Umbellatae; Cameratae = Robustae; Vepreculae is maintained; Brachycladia = Arboreae.

taxonomic reorganisation of conclusions by Papenfuss & Chiang (435) and Papenfuss et al. (436); this has resulted in the reduction of large numbers of species to synonymy, details of which will be clear from the species entries. We have generally followed the decisions made by Papenfuss and colleagues (434; 435; 436), although even then the overall situation remains complex and confusing. That situation is best summarised by Papenfuss (434: 271) and Papenfuss et al. (436: 401–402):

> 'The genus *Galaxaura* has suffered a great deal of misunderstanding. . . . The various species have been assigned to nine genera if *Galaxaura* is included.'

Steentoft (535: 121) summarised aspects of the local western Africa situation, outlining the putative nature of the species distributions deducible from available reports and stating:

> 're-examination of the S. Tomé and Príncipe material shows that these islands probably have the richest *Galaxaura* flora in the Gulf of Guinea.'

On the matter of wider consideration of interrelationships and status of the Galaxauraceae as a whole, see recent publications by Huisman (especially 1987).

Galaxaura adriatica Zanardini
See *Galaxaura oblongata* (Ellis & Solander) Lamouroux.
Note. Considered a synonym of *G. oblongata* by Papenfuss & Chiang (435), Papenfuss et al. (436), and Magruder (383).

Galaxaura annulata Lamouroux
See *Galaxaura rugosa* (Ellis & Solander) Lamouroux.
Note. Placed in synonymy of *G. rugosa* (q.v.) by Papenfuss et al. (436: 421).

Galaxaura coarctata Kjellman
See *Galaxaura rugosa* (Ellis & Solander) Lamouroux (for records) and *Galaxaura decaisnei* J. Agardh (for taxonomic comment in terminal notes).
Note. Supporting information for this synonymy was published in Papenfuss & Chiang (435) and (especially) in Papenfuss et al. (436: 422), where the full picture is presented.

Galaxaura comans Kjellman
See *Galaxaura lapidescens* (Ellis & Solander) Lamouroux and *Galaxaura oblongata* (Ellis & Solander) Lamouroux.
Note. Relationships between the taxa named above need clarification. According to Papenfuss et al. (436: 407–8, 427), the type (a tetrasporophyte) of *G. comans*, from Guadeloupe, West Indies, is actually a plant of *G. lapidescens*, not of *G. oblongata*. *G. lapidescens* was thought to be the tetrasporophyte of *G. oblongata*, but this has more recently been questioned and demonstrated to be untrue for at least one geographical area (Hawaii); see the notes to *G. lapidescens* for further detail. Despite the statements, referred to above, in Papenfuss et al., the same authors elsewhere (p. 410) reiterated Howe's (1918: 197) suspicion that *G. oblongata* (gametophyte) and *G. comans* (tetrasporophyte) represent the same species.

Galaxaura cylindrica (Ellis & Solander) Lamouroux
See *Galaxaura oblongata* (Ellis & Solander) Lamouroux and *Galaxaura lapidescens* (Ellis & Solander) Lamouroux.
Note. According to opinions expressed by Papenfuss et al. (436: 415–418), *G. cylindrica* is a synonym of *G. oblongata* (q.v.); Chou (104) had earlier (1947) indicated that she felt differences between these taxa to be arbitrary rather than real. Following generally the approach of Taylor (540), who commented that *G. cylindrica* and *G. oblongata* are not too difficult to distinguish despite branch-diameter convergence, Norris & Bucher (416: 193) were less definite. They maintained the application of the name *G. cylindrica* for their Belize material, pending further study, but acknowledged morphological overlap and possible conspecificity.

Galaxaura decaisnei J. Agardh
See *Galaxaura obtusata* (Ellis & Solander) Lamouroux [for general concept] and *Galaxaura rugosa* (Ellis & Solander) Lamouroux [for records under *G. decaisnei* for the Canaries].
Note. It has been established that the material representing the type of this taxon, and therefore the basis for the general concept, is a gametophyte from Barbados, West Indies, and should actually be attributed to

G. obtusata (Ellis & Solander) Lamouroux (Papenfuss et al. 436: 418–421); Seagrief (570) followed Papenfuss et al. in accepting this equivalence. By contrast, Vickers's (547) material, from the Canaries and named as *G. decaisnei*, was re-examined by Børgesen (68: 70) and found to be what he then called *Galaxaura squalida* Kjellman; this latter was considered to be the sexual generation of *Galaxaura flagelliformis* Kjellman, both these names subsequently being placed in the synonymy of *G. elongata* J. Agardh, which is now considered a synonym of *Galaxaura rugosa* (Ellis & Solander) Lamouroux. *G. flagelliformis* has also been variously implicated in *Galaxaura lapidescens* auct. and, through the latter, in *G. cylindrica* (q.v.) and *G. oblongata* (q.v.). Some Despreaux Canaries specimens, originally held in Paris under the name *G. decaisnei* J. Agardh (Herb. Thuret), were transferred to Uppsala, where they were then held as *Galaxaura coarctata* Kjellman, another name now considered to be a synonym of *G. rugosa* (q.v.).

Galaxaura elongata J. Agardh

See *Galaxaura rugosa* (Ellis & Solander) Lamouroux.

Note. Papenfuss et al. (436: 421–424) and Cribb (113: 26–27) both reduced *G. elongata* J. Agardh to the synonymy of *G. rugosa*. Re-attributions of records for the list areas have required the assumption that the original determination represented a correct application of the previous name. Thus (largely following Papenfuss et al., 436) records previously attributed in our text to *G. elongata* have been reallocated according to the following equivalence:

records as:

G. decaisnei J. Agardh: see *G. rugosa* (Ellis & Solander) Lamouroux.
G. elongata J. Agardh: see *G. rugosa* (Ellis & Solander) Lamouroux.
G. flagelliformis Kjellman: see *G. lapidescens* (Ellis & Solander) Lamouroux.
G. lapidescens auct.: see *G. lapidescens* (Ellis & Solander) Lamouroux.
G. rugosa auct.: see *G. rugosa* (Ellis & Solander) Lamouroux.
G. squalida Kjellman: see *G. rugosa* (Ellis & Solander) Lamouroux.

Galaxaura filamentosa Chou in W. Taylor

[As *Galaxaura filamentosa* Chou ex W. Taylor]
'tropical West Africa' (561).
[As *Galaxaura filamentosa* Chou]
São Tomé (350; 535; 586).
'in tropical parts of the Atlantic and Pacific Oceans' (350; 586).
'Tropical Africa (N. Gambia – Congo river)' (598).
[As *Galaxaura lapidescens* Lamouroux]
São Tomé (251; 263; 264; 265).

Note. There has been much confusion as to the authorities to be correctly cited for this taxon. The type derives from a collection by W. R. Taylor in the Galapagos Islands and the first description by R. C. -Y. Chou was published in Taylor's (1945) paper on the Allan Hancock Expedition collections from there. This Latin description is verbatim the same as that published later in the same year (September, as opposed to May) by Chou (103) in her own paper. Thus, the authorities are correctly to be stated as above. In their most recent revision of *Galaxaura*, Papenfuss et al. (436: 404, Table I) mentioned a report by Isaac (1971) of the species from Kenya, but seem not otherwise to have dealt with the matter. The material referred to above, and published by Hariot (251) and Henriques (263; 264; 265) as representing *G. lapidescens* Lamouroux (q.v.), is included here on the basis of the opinion expressed by Steentoft (535) that it was misdetermined. Steentoft nevertheless observed that São Tomé plants were more fastigiately branched and possessed somewhat shorter assimilators. Note that the report by Hariot (251) is merely secondary, being directly based on the earlier papers of Henriques (263 et seq.).

Galaxaura flagelliformis Kjellman

See *Galaxaura lapidescens* (Ellis & Solander) Lamouroux [for records] and *Galaxaura elongata* J. Agardh [for taxonomic comment].

Galaxaura fragilis (Lamarck) Lamouroux ex Decaisne [and other authority combinations]

See *Galaxaura oblongata* (Ellis & Solander) Lamouroux.

Note. Authorities hitherto quoted for this combination were usually '(Lamouroux) Decaisne', 'Lamouroux' or 'Decaisne'; critical nomenclatural and taxonomic revision by Papenfuss et al. (436: 415–418) resulted in recognition of the above more accurate citation. Those authors presented also detailed synonymy, which we have accepted, consequent upon examining the type (a presumed gametophyte from the West Indies, filed under *Dichotomaria fragilis*, ex Herb. Lamarck, in Herb. Mus. Paris).

Galaxaura frutescens Kjellman
See *Galaxaura marginata* (Ellis & Solander) Lamouroux.
Note. Papenfuss et al. (436: 413–4) indicated these two taxa (inter alia) to share many attributes, but they did not have available material in sufficient amounts or state adequate to arrive at a final decision. The type of *G. frutescens* Kjellman is ex Herb. Areschoug and derives from Bahía, Brasil; the material, like that of *G. marginata*, shows a marginal ridge. Later in the same publication (436: 427), Papenfuss et al. indicated their opinion that *G. frutescens* is likely to be shown by future research to be conspecific with *G. marginata*.

Galaxaura fruticulosa Kjellman
See *G. subfruticulosa* Chou in W. Taylor and the notes to *G. fruticulosa* (Ellis & Solander) Lamouroux.

Galaxaura fruticulosa (Ellis & Solander) Lamouroux
[As '*zoophyta fruticulosa (galaxaura)*']
Canaries (219).
Note. See also the entry for *Galaxaura subfruticulosa* Chou in W. Taylor in the context of the possible conspecificity of the present taxon with *G. fruticulosa* Kjellman and with *G. subfruticulosa*. The above name is used in referring to the organism that provided the substrate for *Conferva villum* Agardh (q.v.). The *Galaxaura* taxon involved is clearly the same as that recorded earlier in the same work (Gaudichaud, 219: 6–8, 1826) as '*galaxaura lapidescens*'. See also the entry for the latter species.

Galaxaura lapidescens (Ellis & Solander) Lamouroux
Canaries (128A; 306B; 436; 598; 604; 605).
Cape Verde Islands (598).
Salvage Islands (598).
[As *Galaxaura lapidescens* Lamouroux]
Canaries (38; 126; 127; 142; 145; 219; 259; 263; 264; 318; 391; 535).
Note. See also the record from Gaudichaud (219: 156), as *Galaxaura fruticulosa* (q.v.).
Cape Verde Islands (38; 145; 259).
St Helena (142; 259; 260; 391).
'Throughout all tropical seas' (410).
[As *Galaxaura lapidescens* (Solander) Lamouroux]
Canaries (27; 131).
[As *Galaxaura lapidescens* (Solander & Ellis)]
Salvage Islands (381; 439).
Note. Piccone (439: 35; 55) noted this taxon as 'G. oblongata (Sol. et Ell.) cf. G. lapidescens (Sol. et Ell.)', based entirely on the record in Lowe (381).
[As *Galaxaura (Microthoe) lapidescens* Lamouroux]
Canaries (257).
'Tropical Ocean' (257).
[As *Galaxaura (Dichotomaria) lapidescens*]
Canaries (313).
[As *Galaxaura lapidescens* (Solander) Lamouroux et var. *tomentosa* (Kützing)]
Canaries (390; 436; 441; 444).
[As *Galaxaura lapidescens* Lamouroux var. *tomentosa* Kützing]
Canaries (439).
[As *Actinotrichia lapidescens* Schmitz]
Canaries (547).
Note. See the note at the entry for *Actinotrichia lapidescens* Schmitz.
[As *Galaxaura flagelliformis* Kjellman]
Canaries (13; 38C; 68; 191; 226; 227; 379; 490).
Salvage Islands (38C; 556A).
[As *Galaxaura flagelliformis* (Kjellman) Børgesen]
Canaries (14; 16; 230; 247; 375; 489; 556).
Cape Verde Islands (556).
Salvage Islands (231; 375; 556).
[As *Galaxaura flagelliformis* (Kjelin.) Børgs. [sic!]]

Canaries (229; 610).
[As *Galaxaura flagelliformis* (Kjellman) emend. Børg.]
Canaries (38B; 68; 71; 78; 214; 235).
Salvage Islands (38B; 381).
[As ?*Galaxaura flagelliformis* (Kjellman) emend. Børgs. (*G. lapidescens* Picc.)]
Salvage Islands (452).
[As *Galaxaura flagelliformis* Foslie]
Canaries (235).

Note. Records published by Henriques (263; 264; 265) for São Tomé [Ins. Rolas] under the name *Galaxaura lapidescens* Lamouroux, based on collections by Quintas, are actually representative of *Galaxaura filamentosa* (q.v.) (Steentoft; 535). The latter author (535), nevertheless, found the São Tomé plants to be more fastigiately branched and to have somewhat shorter assimilators. Steentoft (535) also, following Howe (1918: 196), suggested that *G. lapidescens* represents the asexual (tetrasporophytic) phase of the sexual *Galaxaura cylindrica* (Ellis & Solander) Lamouroux, now considered (Papenfuss et al. 436: 415–418) as synonymous with *Galaxaura oblongata* (Ellis & Solander) Lamouroux (q.v.). The tetrasporophyte/gametophyte relationship of *G. lapidescens* and *G. oblongata* has been questioned by some workers and has recently (Magruder; 383) been shown to be untrue for Hawaii, where the *G. oblongata* tetrasporophyte is small, inconspicuous, and filamentous. See the notes to *G. oblongata* and the discussion in Magruder (383) for additional comment. See also the notes to *Galaxaura comans* Kjellman, *Galaxaura fruticulosa* (Ellis & Solander) Lamouroux, and *Galaxaura subfruticulosa* Chou in W. Taylor. According to Audiffred (38C: 175), *G. flagelliformis* Kjellman is the tetrasporophytic phase of *G. squalida* Kjellman.

Galaxaura marginata (Ellis & Solander) Lamouroux
Cameroun (288; 350; 586).
Côte d'Ivoire (287; 288; 350; 586).
Gabon (288; 294; 350; 586).
Ghana (288; 299; 338; 350; 535; 586).
Liberia (129; 287; 350; 586).
Príncipe (288; 350; 535; 586).
São Tomé (251; 288; 350; 535; 539; 586).
Senegambia (296; 319).
Warm Atlantic (535).
'in warm temperate and tropical parts of the Atlantic Ocean.' (350; 586).
'Tropical Africa (N. Gambia – Congo river)' (598).
[As *Galaxaura marginata* (Solander) Lamouroux]
Ghana (153).
[As *Galaxaura marginata* (Solander in Ellis) Lamouroux emend. Kjellman]
Cameroun (139).

Note. The De Toni (139) record is based directly on data provided in Pilger (454).

[As *Galaxaura marginata* Lamouroux]
São Tomé (251; 263; 264; 265).

Note. Reports in 263 and 264 include records from the adjacent islet of Rolas.

[As *Galaxaura marginata* Kützing f. *marginata* J. Agardh]
Senegambia (390).
[As *Galaxaura (Microthoe) marginata* Lamouroux]
'Tropical Atlantic . . . Ocean' (255).
'Tropical Oceans' (257).
[As *Galaxaura tenera* Kjellman]
Gabon (350; 435; 570).
'Tropical Africa (N. Gambia – Congo river)' (598).
'widespread in warm temperate and tropical seas' (350).

Note. The Gabon records have often been presented in the form of the phrase 'Gabon River, West Africa' (435; 570).

[As *Galaxaura ventricosa* Kjellman]
Gabon (104; 139; 313; 435; 436; 535; 561; 570).
'Tropical eastern Atlantic' (277; 561).

'Tropical western Africa' (277).

Note. The records from Gabon have often been presented (313; 435; 436; 570) in the form 'Gabon River, West Africa'. De Toni gave even further detail (139: 198) in his Latin statement: 'in Oceano Atlantico inferiore in ostio fluminis "Gabon" Africae occidentalis meridionalis (E. Jardin)'. He also repeated Kjellman's (313) observation that the taxon was most closely allied to *G. veprecula*.

[As *Brachycladia australis* Sonder [= *Zanardinia marginata* (Solander) J. Agardh]]
Gabon (250).
[As *Brachycladia marginata* (Solander) Schmitz]
Cameroun (454).
Senegambia (131; 390).
[As *Brachycladia marginata* f. *marginata* (Kützing) J. Agardh]
Senegambia (131).
[As *Brachycladia marginata* (Solander) Schmitz f. *linearis* (Kützing) J. Agardh]
Cameroun (454).
[As *Brachytrichia marginata* (Solander) Schmitz]
São Tomé (251).
[As *Zanardinia marginata* J. Agardh]
'Warm Atlantic' (410).
[As *Zanardinia marginata* J. Agardh f. *marginata* J. Agardh]
Senegambia (27).

Note. Cordeiro-Marino (108) repeated Howe's (1918) comments on dimorphism in *Galaxaura*; the overall conclusion then was that *G. marginata*, for which only the tetrasporophyte was known, could possibly have *G. occidentalis* Børgesen (60: 109) as its sexual phase. A preliminary revision of *Galaxaura* by Papenfuss & Chiang (435) concluded that *G. tenera* Kjellman embraced the 'species' *G. stupocaula* Kjellman [*stupicaula*], *G. clavigera* Kjellman, *G. veprecula* Kjellman, and *G. ventricosa* Kjellman. These authors further commented that various characteristics of *G. tenera* agreed very well with those of *G. marginata* and that the two may have been conspecific. On the basis of variable, often overlapping, local Brazilian specimens, Cordeiro-Marino (108) agreed but hesitated to formalize the issue pending study of types and further field-populations. Subsequently, Papenfuss et al. (436: 411–415) reduced *G. tenera* Kjellman to synonymy with *G. marginata* (Ellis & Solander) Lamouroux, along with *G. clavigera* Kjellman, *G. occidentalis* Børgesen, *G. stupocaula* Kjellman, *G. ventricosa* Kjellman, and *G. veprecula* Kjellman.

In work on material from the list area, Steentoft (535: 122) noted three growth forms amongst specimens from São Tomé and Príncipe; one, including sexual material, manifested characteristics intermediate between *G. ventricosa* Kjellman (from Gabon) and *G. veprecula* Kjellman (from the Indian and Pacific Oceans). Asexual material amongst the specimens had much in common with *G. marginata*, *G. stupicaula*, and *G. frutescens* (both segregates from *G. marginata* and created by Kjellman). Steentoft (535) therefore suggested 'the whole complex should be re-examined together.'

Seagrief (570), dealing with material from nearby South Africa, concluded that *Galaxaura marginata* sensu Krauss (1846: 214), *Zanardinia marginata* sensu Barton (1893: 171, pro parte), *Z. marginata* b. *diesingiana* (Zanardini) J. Agardh, and *Brachycladia marginata* f. *diesingiana* (Zanardini) De Toni were all related to *Galaxaura diesingiana* Zanardini, not to the true *Galaxaura marginata* as recorded here.

Galaxaura oblongata (Ellis & Solander) Lamouroux
Canaries (2; 8; 13; 16; 68; 72; 80; 97; 128A; 191; 226; 227; 230; 233; 306B; 375; 435; 436; 489; 490; 535; 584; 598; 604; 610).
Cape Verde Islands (535; 598).
Côte d'Ivoire (288; 350; 586).
Gabon (288; 294; 350; 586).
Ghana (153; 288; 299; 338; 350; 535; 586).
Liberia (129; 350; 586).
Príncipe (288; 350; 436; 535; 586).
São Tomé (288; 350; 436; 535).
Salvage Islands (38B; 231; 375; 381; 439; 452; 598).
'a tropical Atlantic alga' (2).
'circumtropical' (280; 435).
'côtes occidentales d'Afrique et aux Canaries' (184).

'in warm temperate and tropical seas' (350; 586).
'Pantropical and subtropical' (535).
'Tropical Africa (N. Gambia – Congo river)' (598).
'world wide distribution in tropical and subtropical waters' (383).
[As *Galaxaura oblongata* (Kjellman) Börgs.]
Canaries (229)
[As *Galaxaura oblongata* Lamouroux]
Canaries (493).
[As *Galaxaura adriatica* Zanardini]
Canaries (177).
'côtes occidentales d'Afrique et aux Canaries' (184).
[As *Galaxaura cylindrica* (Solander [or Ellis & Solander]) Lamouroux]
Canaries (13; 68; 71; 191; 227; 277; 390; 436; 439; 535).
Cape Verde Islands (535).
Príncipe (251; 265; 436).
São Tomé (251; 263; 264; 265; 436; 535).
'pantropical' (535).

Note. The São Tomé records in 263 and 264 include presence on Ins. Rolas, the nearby islet.

[As *Galaxaura cylindrica* Lamouroux]
Canaries (38).
Cape Verde Islands (38; 145; 260).
[As *Galaxaura cylindrica* (Solander in Ellis & Solander) Kjellman]
Canaries (108).
Cape Verde Islands (100; 183).
[As *Galaxaura fragilis* (Lamouroux) Decaisne]
Cape Verde Islands (41).
[As *Galaxaura fragilis* Lamouroux]
Cape Verde Islands (38; 261; 262; 408; 528; 551).
Gabon (250).
'Mers chaudes en general' (38).
'Tropical seas' (410).
[As *Galaxaura fragilis* Decaisne]
Cape Verde Islands (41; 42).
[As *Galaxaura fragilis* (Lamarck) Decaisne]
Gabon (250).
[As *Galaxaura fragilis* Decaisne var.]
Canaries (439).

Note. Piccone (439) gave no information regarding a varietal name. Levring (375) reported this species to be well represented in the Salvage Islands, but not to be present elsewhere in the Madeira group. Piccone (439) noted this taxon as 'G. oblongata (Sol. et Ell.) cf. G. lapidescens (Sol. et Ell.),' based directly on the record in Lowe (381).

There has been long debate on the possible conspecificity of *G. oblongata* and *G. cylindrica* (q.v.). Steentoft (535: 121) appeared from her comments to be of the opinion that differences between these two taxa were that *G. oblongata* is coarser and has more divergent branching. She further indicated that '*G. cylindrica* is perhaps the sexual phase corresponding to the asexual phase known as *G. lapidescens*.' We have not followed this – see the details below. Cordeiro-Marino (108: 32) indicated general acceptance of the close relationships between *G. oblongata* and *G. cylindrica*, not only because of the merely narrower and thinner segments of the latter, but also in a manifest lack of data on tetrasporophytic plants, only the sexual phases being known. Following data variously presented in Howe (1918) and Børgesen (68; 80), Steentoft (535) considered the corresponding tetrasporophyte of the sexual phase *G. oblongata* to be the taxon known as *G. comans* Kjellman (q.v.), not known from the eastern Atlantic. Cordeiro-Marino (108) also repeated Howe's (1918) comments that *G. lapidescens* (Ellis & Solander) Lamouroux (q.v.) and *G. comans* were possibly the tetasporophytic phases, respectively of *G. cylindrica* and *G. oblongata*. Thus, despite accepting (see above) close relationship between the latter two taxa, Cordeiro-Marino still maintained them as separate, in common with many other phycologists, including Howe and Børgesen, mentioned above. Howe and Børgesen both considered the demarcation between the entity [*G. comans*

and *G. cylindrica*] and the entity [*G. comans* and *G. lapidescens*] to be arbitrary. None of this accords well with the more recent opinions of Papenfuss & Chiang (435) and Papenfuss et al. (436), who submerged *G. cylindrica* in the synonymy of *G. oblongata* and believed *G. lapidescens* to be a good species, with *G. comans* as its synonym. We have adopted the views of these more recent workers, especially as outlined in 436, the most recent paper. On other aspects of the differences/distinctness of *G. cylindrica* and *G. oblongata*, see the notes presented at *G. cylindrica*. It is worth mentioning that Børgesen also variously stated (68) that Lamouroux's specimen of *G. oblongata*, which he (Børgesen) examined, is a form of *G. obtusata* (Ellis & Solander) Lamouroux, and that (80) it is impossible to separate the Red Sea species *G. schimperi* Decaisne from *G. oblongata*. Chou (104) considered that *G. oblongata* perhaps represented the sexual phase of more than one species, whilst Itono (277: 14, 16) indicated *G. fastigata*, *G. pilifera*, *G. cylindrica*, and *G. oblongata* closely to resemble each other in their external features, leading most Japanese phycologists to regard the latter three species as *G. fastigiata*. Despite his arbitrariness in dividing the four species on the basis of ecologically- or physiologically-affected characteristics, however, Itono felt they should be maintained pending further work.

Recent work by Magruder (383) has shown that Hawaiian *Galaxaura oblongata* has a triphasic life history, with conspicuous gametophytes and small inconspicuous filamentous tetrasporophytes. In this it accords with data established for two other genera in the Galaxauraceae [= Chaetangiaceae], *Scinaia* and *Pseudogloiophloea*, even having much the same tetrasporophyte form. Most other known species of *Galaxaura* and *Actinotrichia* have conspicuous macroscopic tetrasporophytes, with only a few *Galaxaura* spp. (where the tetrasporophyte is not with absolute certainty known) having possibly small filamentous tetrasporophytes. Magruder (383: 407) commented that this presence of inconspicuous tetrasporophytes was certainly responsible for difficulties in aligning putative tetrasporophyte 'species' with the corresponding gametophyte 'species' in *Galaxaura*. Details of both spermatangial conceptacle development and carpogonial branch development are very similar in *G. oblongata*, *G. obtusata*, *G. diesingiana*, and *G. marginata*, according to Magruder (op. cit.).

Galaxaura obtusata (Ellis & Solander) Lamouroux
Canaries (68; 71; 97; 191; 227; 247; 277; 372; 435; 436; 598).
Cape Verde Islands (598).
Gabon (250; 294; 350; 586).
Salvage Islands (598).
Sierra Leone (30; 350; 586).
'eastern Atlantic (Canary Islands) westward to East Africa' (435).
'The tropical Ocean, in all longitudes' (256).
'Tropical Africa (N. Gambia – Congo river)' (598).
'Tropical and subtropical oceans' (257).
'widespread in warm temperate and tropical seas' (350; 586).
[As *Galaxaura obtusata* J. Agardh]
Angola (41; 42).
'Warm Atlantic' (41; 42).
[As *Galaxaura umbellata* Lamouroux]
Canaries (37; 41; 42; 408).
Cape Verde Islands (408; 528; 551).
'Warm Atlantic' (410).
[As *Galaxaura umbellata* (Esper) Lamouroux]
Canaries (141A).
Salvage Islands (38B; 215).
[As *Galaxaura umbellata* Montagne]
Canaries (38).
Cape Verde Islands (38; 551).

Note. Authorities quoted as '(Solander) Lamouroux' (e.g. in Itono (277: 7)) have been treated throughout the species entry as though the form in the present entry heading had been employed. Børgesen (68) examined Lamouroux's specimens labelled as *G. umbellata* and concluded that they represent *G. obtusata*. Papenfuss et al. (436: 418–421) and Seagrief (570: 30) concluded equally that this was correct, at least pro parte for *G. umbellata*. Askenasy's (37; 38) records as *G. umbellata* may really represent *G. rugosa* (Ellis & Solander) Lamouroux. In 1897, Askenasy (38: 165), although presenting his entry under the heading '*G. umbellata* Mont. non Lamour.', added a terminal comment in French, which translated as:

'This species, also found on the Canaries and named by Montagne *G. umbellata*, seems to me to be different from the species so named by Espen [sic!], Lamouroux, Kützing and J. Ag. (Epicrisis). It is nearer to *G. rugosa* (Soland.) Kütz.' See the entry for the latter species, as well as the note presented at *G. decaisnei* J. Agardh, for other comment of relevance to the present taxon.

Itono (278: 8) regarded *G. obtusata* and *G. umbellata* as very similar and not separable into two species. All these forms were suggested as related to the sexual phase of *Galaxaura robusta*, which is not reported for coasts of the list area.

Galaxaura rugosa (Ellis & Solander) Lamouroux
Ascension (37; 535).
Cameroun (288; 350; 454; 535; 586).
Canaries (37; 128A; 232B; 306B; 436; 598; 604; 605).
Cape Verde Islands (37; 38B; 535; 598).
Côte d'Ivoire (287; 288; 350; 586).
Gabon (586).
Ghana (586; BM (unpublished)).
Liberia (287).
Príncipe (436; 586).
Salvage Islands (38B; 556A; 598).
São Tomé (251, pro parte; 263; 265; 288; 350; 436; 535; 586).
'in oceano calidiore atlantico' (27).
'Pantropical' (535).
'Tropical Africa (N. Gambia – Congo river)' (598).
'wärmeren Atlantischen Ocean (Kanaren, Antillen)' (37).
'widespread in warm temperate and tropical seas' (350; 586).
[As *Galaxaura rugosa* Lamouroux]
Cape Verde Islands (38; 145; 259; 260).
São Tomé [including Rolas] (263; 264).
'Océan Atlantique tropical' (38).
'Warm Atlantic' (410).
[As *Galaxaura rugosa* (Solander) Lamouroux]
São Tomé (265 pro parte).
'in wärmeren atlantischen Ocean' (503).
[As *Galaxaura rugosa* Solander]
Canaries (439).
São Tomé (251 pro parte, 265 pro parte).
[As *Galaxaura annulata* Lamouroux]
Cape Verde Islands (38; 408; 528).
[As *Galaxaura coarctata* Kjellman]
Canaries (139; 313; 436; 538).
[As *Galaxaura Decaisnei* J. Agardh]
Canaries (547).
'in oceano Atlantico calidiore' (27; 131).
[As *Galaxaura elongata* J. Agardh]
Canaries (435).
Gabon (294; 350).
São Tomé (350).
'eastern Atlantic (Canary Islands) westward to East Africa' (435).
'widespread in warm temperate seas and pantropical' (350).
[As *Galaxaura squalida* Kjellman]
Canaries (13; 38B; 38C; 68; 97; 226; 227; 302; 304; 351; 379; 414; 535).
Cape Verde Islands (38B; 38C; 100; 183).
Salvage Islands (38B; 556A).
São Tomé (535).
'pantropical' (535).

Note. The unpublished record from Ghana is based on a specimen (in BM) collected by V. J. Foote in 1946. Records that appear above as pro parte from São Tomé require reference to the other taxon involved; in all cases, this appears to be *Galaxaura subfruticulosa* Chou in W. Taylor (q.v.) – see additional notes below. The report from the Salvage Islands (38B; 556A) initially (Prud'homme van Reine, 15 Nov. 1982, in litt. to JHP; 556A) indicated the records as new for that island group. The inclusion under this species entry of the records established as *Galaxaura annulata* Lamouroux for the Cape Verde Islands is based on the synonymy deduced and presented by Papenfuss et al. (436); the nature and accuracy of determination of the actual material involved have not been checked. The correctness of placement here of the records established as *G. Decaisnei* J. Agardh may not be firmly authenticated, but has been effected on the basis of the area concerned (Canaries; warm Atlantic ocean); see the notes to the species entry for *G. decaisnei*. Although the type of *G. decaisnei* (Barbados) proved (cf. 436) to be *Galaxaura obtusata*, Vickers's (547) material from the Canaries emerged on examination by Børgesen (68) as *G. squalida* [= *G. elongata*, now synonymised with *G. rugosa*]. For a contrasting opinion on *G. squalida* status, see Audiffred (38C: 175) and the note to *G. squalida* here.

For a full recent statement of the synonymy, similarities, and previously employed application of names to all or parts of this taxon in different geographical areas, see Papenfuss et al. (436). See also Cribb (113: 26–27). Steentoft (535: 123) suggested that *G. rugosa* and *G. subfruticulosa* Chou have hitherto been confused amongst São Tomé material, hence the 'pro parte' recording of certain previous records, mentioned above. The significance of such confusion depends on more firm understanding than currently available of morphological relationships and life-history connections between these taxa, and between both and *G. subverticillata* Kjellman. See the detailed notes to *G. subfruticulosa* Chou and *G. obtusata* (Ellis & Solander) Lamouroux; Papenfuss et al. (436: 425) suggested that the tetrasporophyte of *G. rugosa* is probably that referred to as *G. subverticillata* Kjellman, but further work is required to establish the connection. *G. subverticillata* is not recorded for the eastern Atlantic.

It is possible (cf. Itono 277: 8–9) that the Pacific *Galaxaura pacifica* and the Atlantic *G. rugosa* are different forms of the same species; both have free assimilatory filaments and similar overall morphologies, although it seems that the free filaments may persist in older parts of *G. rugosa*, as opposed to being early deciduous in *G. pacifica*.

Galaxaura squalida Kjellman

See *Galaxaura rugosa* (Ellis & Solander) Lamouroux and *G. elongata* J. Agardh.

Note. According to Chou (104), the type of *G. squalida* (from the Virgin Islands) is in Herb. Areschoug under the name *G. rugosa*. According to Audiffred (38C: 175), *G. squalida* is the sexual phase of *G. flagelliformis* Kjellman (see *G. lapidescens* (Ellis & Solander) Lamouroux).

Galaxaura stupicaula ['stupocaula'] Kjellman

See *Galaxaura marginata* (Ellis & Solander) Lamouroux.

Note. According to Chou (103), the form of the epithet should be *stupicaulis*, to agree with the generic substantive form. The sexual phase involved could be *G. veprecula* Kjellman [= *G. marginata*, q.v.]. Papenfuss & Chiang (435: 304) rendered the epithet as [*G.*] *stupocaula* and considered it to be representative of *Galaxaura tenera* Kjellman [? = *G. marginata*, q.v.]; these data are repeated and elaborated in Papenfuss et al. (436: 411–415).

Galaxaura subfruticulosa Chou in W. Taylor

São Tomé (350; 535; 586).

'in tropical parts of the Atlantic and Pacific Oceans' (350; 586).

'Tropical Africa (N. Gambia – Congo river)' (598).

[As *Galaxaura rugosa* (Ellis et Solander) Lamouroux, pro parte]

São Tomé (251; 263; 264; 265).

Note. See the detailed note to *Galaxaura rugosa* (Ellis & Solander) Lamouroux. There has been much debate about the status and relationships of this present taxon. Steentoft (535: 124) observed that *G. subfruticulosa* Chou is closely related to *G. subverticillata* Kjellman, only the latter having been previously recognised in the Atlantic (and then only the western Atlantic). Itono (278: 5–6) repeated the comment that *G. subfruticulosa* is most closely related to *G. subverticillata*; he concluded, after examining the supposed differences between the taxa, that 'it is not inconceivable that *G. subfruticulosa* and *G. subverticillata* will be found to be conspecific.'

According to Papenfuss et al. (436: 409), *G. fruticulosa* Chou in W. Taylor comes close to *G. lapidescens* (q.v.). *G. fruticulosa* was established on the basis of material from Revillagigedo Is., Pacific Mexico, and said by Chou to be closely similar to *G. ramulosa* and *G. tomentosa*. *G. lapidescens* and *G. fruticulosa* may well eventually be thought conspecific. The significance of this is that Chou renamed *G. fruticulosa*

Kjellman, calling it *G. subfruticulosa* and designating a new type (from Clarion Is., Revillagigedo). Papenfuss et al. (436: 409) went on 'Whether Chou's species and the one of Kjellman actually are representative of the same species remains to be determined.'

Later in their 1982 publication (436), Papenfuss et al. (pp. 424–5) commented that *Galaxaura subverticillata* Kjellman, *G. fruticulosa* Kjellman, and *G. subfruticulosa* Chou in W. Taylor all have swollen basal cells to both long and short assimilatory filaments. The conspecificity of *G. fruticulosa* Kjellman, *G. fruticulosa* (Ellis & Solander) Lamouroux, 1816 (from Bahamas), and *G. subfruticulosa* Chou in W. Taylor (Revillagigedo) cannot really be established without detailed examination of the types. Ellis & Solander's *Corallina fruticulosa* (1786) illustration shows that *G. subverticillata* is not of the same taxon; the branches of the latter do not 'grow smaller towards the ends.' The verticillate arrangement of assimilatory filaments in East African *G. subverticillata* was not mentioned by their description of *C. fruticulosa*, nor is it clear in Kjellman's (313) treatment of his *G. fruticulosa*, although it is so in his description of *G. subverticillata*. Papenfuss et al. (436: 425) went on to state:

> 'Extended assimilatory filaments of *Galaxaura subfruticulosa* Chou are evenly distributed over the entire surface of the thallus. . . . and slightly verticillate only near the tips. This taxon is distinct from *G. subverticillata* Kjellman. On this basis Chou (1945, p. 42) placed *G. subfruticulosa* very close to *G. ramulosa* and *G. tomentosa*, taxa which we have reduced to synonymy of *G. lapidescens*.'

Confusion between *G. subverticillata* and *G. lapidescens* may have partially arisen because the verticillate arrangement in the former is seen clearly only in young branches, the hairs disappearing with ageing of the branch. *G. subverticillata* Kjellman is probably the sporophyte of *G. rugosa* (q.v.); 'Until this can be established with certainty, however, it seems prudent to retain *G. subverticillata* as an autonomous species' (Papenfuss et al. 436: 425).

Galaxaura subverticillata Kjellman
See the terminal notes to the entry for *Galaxaura subfruticulosa* Chou in W. Taylor.

Galaxaura tenera Kjellman
See the entries for *Galaxaura marginata* (Ellis & Solander) Lamouroux [records] and for both *G. marginata* and *G. veprecula* Kjellman [notes].

Galaxaura umbellata Lamouroux
See *Galaxaura obtusata* (Ellis & Solander) Lamouroux [records; notes] and *Galaxaura rugosa* (Ellis & Solander) Lamouroux [notes].

Note. The rationale for first attribution of valid publication to Lamouroux (331: 262) is presented in Papenfuss et al. (436; 419, footnote 11). The combination has sometimes been attributed to (a) Montagne; (b) (Esper) Lamouroux; (c) (Esper) J. Agardh, as authorities.

Galaxaura ventricosa Kjellman
See *Galaxaura marginata* (Ellis & Solander) Lamouroux.

Note. Papenfuss et al. (436: 411, 412) referred to the type of *G. ventricosa* Kjellman, from [near the mouth of] the Gabon River, West Africa; they placed the taxon in synonymy with *G. marginata* (Ellis & Solander) Lamouroux (q.v.). Chou (104) had earlier indicated it to be impossible to distinguish between *G. ventricosa* and *G. veprecula* on the basis of anatomy; both these taxa are in any case now accepted as lying within the synonymy of *G. marginata* (Ellis & Solander) Lamouroux.

Galaxaura veprecula Kjellman
See *Galaxaura marginata* (Ellis & Solander) Lamouroux.

Note. Jaasund (1977*b*: 417) stated that the conspecificity of *Galaxaura veprecula* (from Madagascar) with *Galaxaura tenera* Kjellman (type locality: Mombasa) is still an open question. More recent opinion (e.g. Papenfuss et al., 436: 411 et seq.) does not, however, confirm this, since many workers accept both these taxa as lying within the synonymy of *G. marginata* (Ellis & Solander) Lamouroux; we concur in the latter view. See also the notes to *G. ventricosa* Kjellman.

Galaxaura spp.
Canaries (3; 71; 89; 117; 118; 214; 229; 253A; 301; 436; 567).
Cape Verde Islands (191; 500).
Ghana (491).
Sénégal (59; 282; 611).

'Gulf of Guinea' (611).
'West Africa' (290).
Note. Bornet (89) stated he had '3 espèces' of *Galaxaura*.

Ganonema farinosa (Lamouroux) Fan & Wang
See *Liagora farinosa* Lamouroux, and Abbott (1).

Ganonema pinnatiramosa (Yamada) Fan & Wang in Fan et al.
See *Liagora farinosa* Lamouroux, and Abbott (1).

Gastroclonium clavatum (Roth) Ardissone
Canaries (232B; 253; 583; 598; 604; 605).
[As *Gastroclonium ovatum* (Hudson) Papenfuss]
Canaries (226: 227).
Note. Haroun Tabraue et al. (253: 273–4) recorded the taxon as 'Nueva cita para Canarias.' The first citation was of epiphytes on *Corallina elongata*, later (232B) extended to those on *Codium taylorii*. Haroun Tabraue et al. were also (loc. cit.) responsible for transferring the previous records as *Gastroclonium ovatum* (Hudson) Papenfuss (q.v.) in 226 and 227 to the present taxon; they stated 'La cita de *Gastroclonium ovatum*. . . . para Pta. Pechigueras, Lanzarote. . . . Gil-Rodríguez & Afonso-Carrillo (1980), tras la revisión del pliego, debe ser eliminada del "Catalogo de las Algas marinas bentónicas para el Archipiélago Canario" y ser incluido como *Gastroclonium clavatum* (Roth) Ardisson.' *G. clavatum* overall distribution was cited as "East Atlantic (Cádiz & Canaries) and Mediterranean.' See also the entry for *Gastroclonium ovatum* (Hudson) Papenfuss – when originally recording their material as that taxon from there (Canarias), Gil-Rodríguez & Afonso-Carrillo (226: 64) stated: 'Esta especie, cuya área de distribución se extiende desde Inglaterra a Mauritania, no había sido señalada precedentemente para Canarias.'

Gastroclonium kaliforme (Goodenough & Woodward) Ardissone
See *Chylocladia verticillata* (Lightfoot) Bliding.

Gastroclonium ovatum (Hudson) Papenfuss
Canaries (128A; 226; 598).
Mauritanie (33; 222; 226; 273; 349; 546).
'Atlantique (de l'Angleterre à la Mauritanie)' (33).
'Atlantique, depuis les côtes anglaises jusqu'en Mauritanie' (222).
'British Isles to Mauritania; Canary Isles' (273).
'desde Inglaterra a Mauritania' (226).
'desde las costas de Inglaterra hasta Mauritania' (546).
[As *Chylocladia ovalis* (Hudson) Hooker]
'D'Angleterre aux Canaries' (89).
[As *Lomentaria ovalis* (Hudson) J. Agardh]
'In Oceano atlantico calidiore' (27).
Note. See also the entry for *Gastroclonium clavatum* (Roth) Ardissone. The Mauritanie record in Lawson & John (349) is based only on data in 33 and 222. It is probable that the older Canaries references (in 89) and the more recent secondary statement in Irvine (273) should both be referred (as with the bases in 226 and 227 for the more recent statement) to *Gastroclonium clavatum* (Roth) Ardissone. Haroun Tabraue et al. (253) established that point.

Gastroclonium reflexum (Chauvin) Kützing
Canaries (33; 227; 273).
'Atlantique (de l'Angleterre aux Canaries)' (33).
[As *Lomentaria reflexa* Chauvin]
Canaries (70; 191).
'English coast southwards to the Canary Islands' (70).
[As *Lomentaria reflexa* (Chauvin) J. Agardh]
Canaries (441; 444).
[As *Lomentaria pygmaea* (Lamouroux) Gaillon]
Canaries (401).
[As *Lomentaria pygmaea* Gaillon]
Canaries (44).

Note. Ardré (33: 141) commented on distinguishing characters for *Gastroclonium*, indicating that her material closely approached the *Coeloseira* of Hollenberg, based on the constant occurrence of polysporangia in certain species; since this latter distinction lacked supporting characters, she preferred to retain the material in *Gastroclonium*. There is slender basis for many of the above records – Piccone (441), who recorded only a single young plant, formed the direct and only basis for his own repeated records in (444), as well as for those published in Børgesen (70) and in Gil-Rodríguez & Afonso-Carrillo (227). This taxon was frequently referred to as *Chylocladia reflexa* [auctorum] and the situation as regards the synonymy is complex (cf. Irvine, 273: 84–85). The record in Montagne (401: 156–7), and therefore also that in Benítez (44), is attributed here on general nomenclatural grounds. Montagne referred in his synonymy only to *Gigartina pygmaea* Lamouroux and *Lomentaria pygmaea* of Gaillon and of Duby. His additional comments included: 'Among other algae, to which it adheres, this species, if red, is doubtfully of the animal kingdom' and he indicated that the species had a great affinity with *Lomentaria pusilla* De Notaris [in litt.] and with *Chondria nana* C. Agardh, all three being very probably only forms of one and the same species. De Toni (132: 566) recognized *Gigartina pygmaea* Lamouroux (with doubt) and *Lomentaria pusilla* Kützing in the synonymy of *G. reflexum* (Chauvin) Kützing; he nowhere in his works referred to *Lomentaria pygmaea* Gaillon, to *Lomentaria pusilla* De Notaris, or to *Chondria nana* C. Agardh, although he did place in that same synonymy *Lomentaria exigua* De Notaris. L. Irvine (273: 85) indicated *G. reflexum* to be 'closely related to *G. clavatum* (Roth) Ardiss. . . . but without the reflexed habit.'

Gelidiella acerosa (Forsskål) J. Feldmann & Hamel
Gabon (294; 350; 586).
São Tomé (350; 535; 586).
Sierra Leone (30; 350; 586).
'in warm temperate and tropical seas' (350; 586).
'most warm seas' (81).
'paraît répandue dans toutes les mers tropicales (Atlantique . . .)' (194).
'Tropical Africa (N. Gambia – Congo river)' (598).
'tropical and subtropical seas' (614).
[As *Gelidium claviferum* Kützing or its 'forma']
São Tomé (251; 263; 264; 265).
[As *Gelidiopsis rigida* (Vahl) Weber-van Bosse]
'Seems to occur in all warm seas' (64).
[As *Gelidium rigidum* (Vahl) Greville]
'in oceano calidiori atlantico' (27).
'Throughout warm seas' (410).

Note. Problems occasionally attach to accurate determination of material of this taxon from the area (see Steentoft, 535). Børgesen (73: 5) earlier (but not acceptedly) recombined this taxon in the genus *Echinocaulon*. Of material from the Admiralty Islands (not directly relevant here), Hemsley (260) commented that 'This is probably a variety of the almost cosmopolitan *Gelidium corneum*, Lamour.' [He was writing under the heading of *Gelidium rigidum* Greville]. For a general statement of synonymy in *Gelidiella acerosa* see Seagrief (570: 30).

Gelidiella pannosa (J. Feldmann) J. Feldmann & Hamel
'sporadically from the French Côte Basque south to Morocco . . . and Sénégal' (614).
[As *Gelidiella tenuissima* J. Feldmann & Hamel]
Canaries (38B; 556A).
Cape Verde Islands (38B).
Mauritanie (38B; 122; 556).
Salvage Islands (38B; 556; 556A).
Sénégal (38B; 122; 556).
'From Biarritz and Portugal southward to Cape Verde.' (375).
'Portugal hasta Cabo Verde (Ardré 1970)' (518).
[As *Gelidiella tenuissima* (Thuret) Feldmann & Hamel]
Canaries (38C).
Cape Verde Islands (38C).
Mauritanie (38C; 121).
Salvage Islands (38C).

Sénégal (38C).
[As *Gelidiella pannosa* (Bornet) J. Feldmann & Hamel]
Canaries (598).
Salvage Islands (598).
'Atlantique (Biarritz, Portugal, jusqu'au Cap Vert)' (33).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).

Note. Fan (1961: 340, note 4) has summarised the nomenclatural and taxonomic history of this taxon in demonstrating that authority and epithet citation should be as stated in the present entry heading. Nevertheless, we have considerable sympathy with the change of epithet to *tenuissima* effected by J. Feldmann & Hamel (195: 102 et seq. [*Revue algol.*] or 226 et seq. [collated reprint]) for this taxon in *Gelidiella* because of the potential confusion arising from the complexities of both taxonomy and nomenclature in the difficult Gelidiales; these complexities are well expressed in the recent work by Maggs & Guiry (614). It is not now possible to reject specific epithets on the grounds of confusion and it is clear that J. Feldmann's combination in *Echinocaulon* (?) of *pannosum* can be treated directly as the basionym for *Gelidiella pannosa*, given the homonymy involved in the earlier treatments of *Gelidium pannosum* Grunow (now *Gelidiopsis pannosa* (Grunow) Schmitz) and *Gelidium pannosum* sensu Bornet, the basis for much of the J. Feldmann & Hamel (194: 195) reasoning.

Even in the case of the perhaps more desirable *Gelidiella tenuissima*, there has been frequent mis-citation of authorities; Thuret's herbarium name was *Gelidium tenuissimum* and, since Feldmann & Hamel were not taking up the whole combination in this MS name, there is no requirement to cite Thuret as authority.

Gelidiella ramellosa (Kützing) J. Feldmann & Hamel
Salvage Islands (38B; 231; 375; 598).

Note. Levring (375) considered this species well-separated from *Gelidiella tenuissima* J. Feldmann & Hamel (= *Gelidiella pannosa* (J. Feldmann) J. Feldmann & Hamel, q.v.). *G. ramellosa* showed good representation in the Salvage Islands, although Levring (loc. cit.) presented its distribution only as the Salvage Islands and Tunis. See also details presented under *Gelidiella tinerfensis* J. Seoane-Camba.

Gelidiella tenuissima J. Feldmann & Hamel
See *Gelidiella pannosa* (J. Feldmann) J. Feldmann & Hamel.

Gelidiella tinerfensis J. Seoane-Camba
Canaries (227; 518; 574; 598; 614).

Note. Seoane-Camba (518; 574) presented, especially in (518), comments on the distinctions between *G. tinerfensis* and its nearest relatives in *Gelidiella* – *G. pannosa*, *G. ramellosa* (q.v.), *G. lubrica*, and *G. trinitatensis*.

Gelidiella sp.
Canaries (38C).
Salvage Islands (38B).

Note. Reported as only sterile material. Audiffred (38C: 175) presented some description of the material from the Canaries.

Gelidiocolax hemisphaerica Gardner
See *Gelidiocolax microsphaerica* Gardner.

Gelidiocolax microsphaerica Gardner
Sénégal (1A; 575).
[As *Gelidiocolax hemisphaerica* Gardner]
Sénégal (122).
'Subtropical Africa [Senegal (N. Gambia), Mauritania, Former W. Sahara]' (598).

Note. Fan & Papenfuss (575: 33) commented that: 'Dangeard in 1952 reported *Gelidiocolax microsphaerica* (in error as *G. hemisphaerica*) from Dakar.' Dangeard (122) did not explain his mis-use of the specific epithet as '*hemisphaerica*', but it may possibly relate to his believing it to be a more accurate reflection of thallus form. Even Abbott & Hollenberg (1A: 342) opened their published description of Gardner's taxon with the words: 'Thallus a smooth, more or less hemispherical mound'. Fan & Papenfuss (575) considered various aspects of the relationships between species currently placed in this genus. In all probability, the *Gelidiocolax* sp. reported from Sénégal and Mauritanie by Dangeard (121) in 1951 is also representative of *G. microsphaerica*; see the following entry.

Gelidiocolax sp.
Mauritanie (121).
Sénégal (121).

Note. Found growing on *Gelidium foliosum* P. Dangeard, particularly on the 'stolons'; the *Gelidiocolax* sp. concerned is almost certainly that subsequently (122) referred to by Dangeard as *G. hemisphaerica* Gardner [= *G. microsphaerica* Gardner] (q.v.).

Gelidiopsis gracilis (Kützing) Vickers
Sénégal (50; 55; 59).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).

Note. Bodard (50) commented that this species was for long confused with *Gelidium crinale* (q.v.) in their collections from Sénégal, since the two often occur intermixed. He continued: 'c'est à notre connaissance la première fois que ce *Gelidiopsis* est signalé en Afrique; il était uniquement connu aux Antilles, avec *Gelidiopsis variabilis* [q.v.] dont nous allons parler.' Later, Bodard & Mollion (59: 198) stated of this species: 'la position systématique est douteuse, il peut être considéré comme une algue tropicale à faible dispersion geographique.' The present species differs from *Gelidiopsis planicaulis* (q.v.) in that the latter lacks the cylindrical axis which is present in at least the distal parts of the former.

Gelidiopsis intricata (C. Agardh) Vickers
Ascension (474; 475).
Canaries (38D; 598).
Cape Verde Islands (38D; 191, 598).
Salvage Islands (38D; 598).
[As *Gelidiopsis intricata* (Kützing) Vickers]
Canaries (38B; 70; 482; 605).
Cape Verde Islands (38B; 100; 183).
Salvage Islands (38B).
'does not extend (southwards) into the Gulf of Guinea' (487).
[As *Gelidiopsis intricata* (Agardh) Schmitz]
Sénégal (542).
[As *Gelidium intricatum* Kützing]
Canaries (68; 118; 486; 489; 495).

Note. It has been questioned (Steentoft, 535: 125–126) that this and *G. variabilis* (J. Agardh) Schmitz are really separate species. See the note to the latter for fuller explanation. Material recorded from São Tomé by Tandy in Exell (539: 386) and from the Cape Verde Islands by J. Feldmann (183) and Chevalier (100), as *G. intricata*, was sterile but, according to Steentoft (loc. cit.), was actually referable to *G. variabilis* (q.v.). It is possible that other records here (as, e.g., 38B (Salvage Islands); 70; 100; 183; 482) should (although sterile/small specimens were again involved) be referred to the *Gelidiopsis variabilis* form, whether or not the latter and *G. intricata* are finally considered to be conspecific. Børgesen (70) merely repeated the record from the Canaries given in Reinbold (482: 22), without additional information. Reinbold's material was also sterile. Audiffred & Weisscher (38B: 29) could not be sure of the determination of their Salvage Islands material, since their specimen was very small. Trochain's (542: 109) material from Sénégal was merely drift – it, too, was referred by Steentoft (535: 126) to *Gelidiopsis variabilis* (q.v.). Sterile specimens may also have caused confusion in routine determination for areas of Atlantic Africa – *G. intricata* may have been misidentified with *Wurdemannia miniata* or *Caulacanthus ustulatus*; see the entries for these latter species. Rodriguez (486) misrendered the specific epithet as *intrincatum* in recording *Gelidium intricatum* from the Canaries. Schiffner (495) merely referred to Børgesen's earlier (68) statements for Tenerife.

Gelidiopsis planicaulis (W. Taylor) W. Taylor
?Bioko (346; 350; 586).
Cameroun (346; 350; 586).
Canaries (556A).
Cape Verde Islands (598).
Gabon (294; 350; 586).
Liberia (129; 350; 586).
Sierra Leone (295; 350; 586).
'in tropical parts of the Atlantic Ocean' (350; 586).

'Tropical Africa (N. Gambia – Congo river)' (598).

Note. A variable species with regard to flattening of branches; W. Taylor suggested (pers. comm.) that West African material was very similar to that from the western Atlantic, although flattening in the former was more localised (294; 350; 586).

Gelidiopsis rigida auctorum [usually (Vahl) Greville or (Vahl) Weber-van Bosse]
See *Gelidiella acerosa* (Forsskål) J. Feldmann & Hamel.

Gelidiopsis variabilis (J. Agardh) Schmitz
Angola (352).
Bioko (346; 350; 586).
Cameroun (122; 288; 350; 586).
Cape Verde Islands (598).
Côte d'Ivoire (288; 350; 586).
Gambia (296; 350; 586).
Ghana (288; 290; 299; 300; 338; 350; 376; 491; 537; 586).
Guinée/Guinea-Bissau (350; ? 529; 586).
Liberia (129; 350; 586).
Mauritanie (349).
São Tomé (288; 350; 586).
Sierre Leone (295; 350; 586).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Tropical Africa (N. Gambia – Congo river)' (598).
'widespread in warm temperate and tropical seas' (350; 586).
[As *Gelidiopsis variabilis* (Greville) Schmitz]
Annobon (456; 457; 535).
Cameroun (500; 535).
Canaries (? 535).
Ghana (535).
Guinée (535).
Mauritanie (192).
São Tomé (93; 535).
Sénégal (50; 121; 122; 529).
[As *Gelidiopsis variabilis* (Greville ex J. Agardh) Schmitz]
Ghana (297).
[As *Gelidiopsis variabilis* Schmitz]
Cameroun (454).
[As *Gelidiopsis intricata* (C. Agardh) Vickers]
São Tomé (539).
Sierra Leone (295).
[As *Gelidiopsis intricata* (Agardh) Schmitz]
Sénégal (542).
[As *Gelidiopsis intricata* (Kützing) Vickers]
Cape Verde Islands (100; 183).

Note. There is doubt as to the distinctions, or indeed the reality of separateness, between *G. variabilis* and *Gelidiopsis intricata* (q.v.). Steentoft (535: 125–126) firmly expressed this in the following terms: 'Larger tuft-forming plants seem to be placed in the former species [*G. variabilis*], low growing turf-forming ones in the latter [*G. intricata*].' In expanding this further, she commented on the Tandy in Exell (São Tomé) material (539) and the Cape Verde Islands records (J. Feldmann, 183; Chevalier, 100). Other records that could possibly concern *G. variabilis* are discussed in the note to *Gelidiopsis intricata* (q.v.). The overall picture seems to be one of difficulty in distinguishing validly between ends of morphological/anatomical clines. Steentoft's opinions were embodied in the following extract from 535: 125–126:

> 'Both *G. variabilis* and *G. intricata*. . . . are probably in need of critical re-examination. The latter name is probably invalid, since it is based on *Sphaerococcus intricatus* C. Ag., the "cotype" of which [J.] Feldmann has examined and reported as a *Gelidium* species, since intercellular rhizines are present. . . . it seems to the present writer that there is some doubt as

to the distinctness of [these species]. . . . However a much greater acquaintance with the American forms of the so-called *G. intricata* is required before any conclusions can be reached.'

Sterile material of *G. variabilis* may, for Atlantic Africa, have at times also been confused with *Wurdemannia miniata* (q.v.) or *Caulacanthus ustulatus* (q.v.).

The reports from Sénégal in Bodard (50) and Sourie (529) have similarly an appreciable degree of uncertainty about them. Sourie (529: 306) himself expressed doubt about his records of the species from Guinée/Guinea-Bissau, and his citation from Sénégal stated: '*Gelidiopsis* sp. (*G. variabilis* (Greville) Schmitz?).' Bodard (50: 83–84) indicated that *G. variabilis* from Sénégal was much more robust (but much rarer) then *Gelidiopsis gracilis* (Kützing) Vickers; his single certain specimen of *Gelidiopsis variabilis* from Pointe de Sarène, Sénégal (February), proved identical with a plant collected by Sourie (529) at Cap Rosso. At first sight, *G. variabilis* could easily be confused with *Gracilaria augustissima* (sic! – for *angustissima*) (Bodard 50: 83–84), but the anatomical structure proved to be of *Gelidiopsis*, rather close to *G. gracilis* (Kützing) Vickers.

Gelidiopsis sp.
Cameroun (337; 344; 393; 394).
Ghana (42A; 92; 220; 338; 344; 393; 394).
Guinea-Bissau/Guinée (529).
Guinée (269; 344; 384; 393; 394; 529).
Nigeria (344; 393; 394; 415).
Sénégal (393; 394; 529).

Note. For a possible attribution of the Sénégal record in Sourie (529), see the entry for *Gelidiopsis variabilis* (J. Agardh) Schmitz.

Gelidium

Bornet's earlier categorization of *Gelidium* as 'genre diabolique' is hardly a matter for dispute; this applies whether the concern is nomenclatural, taxonomic, morphological, or ecological (Dixon & De Valera, 1961; Dixon & Irvine, 172). This complicated form-variation, often seasonally different in individual plants and populations, is therefore also reflected in the excessive names scattered throughout the literature, and probably lies behind the large number of species reported from South Africa sensu stricto and not from apparently similar areas to the north and within the check-list area. Cases in point are *Gelidium amansii* (Lamouroux) Lamouroux, *G. arenarium* Kylin, *G. caespitosum* Kylin, and *G. pristoides* (Turner) Kützing. On the other hand, there are numbers of species names applied within the check-list area that have never been employed outside it, to north or south. Overall rationalization of the taxonomy and nomenclature on a pan-Atlantic basis is required, but the difficulties and time-consumption make the prospect daunting. Furthermore, approaches to species recognition via morphological characteristics alone are clearly insufficient if a meaningful result is to be obtained; biochemical and genetic levels will require exploration on a geographically widespread basis to rationalize the different patterns of understanding of the taxa, and to eliminate contrasting and purely local traditions of naming.

No such vast and daunting project has been undertaken here and consequently no general reallocation of records depending on a totally reorganised system of name-allocation is presented. Transfers of individual records or groups of records have been made on restricted bases, where there has been good reason to believe that action necessary. In the absence of any such individual information, the publishing authors' names have been maintained, if for no other reason than to draw attention to current anomaly requiring further work. Thus, in the absence of real understanding of limits of taxa considered as species level across virtually the whole genus, the recording by name (and therefore the reality) within the present list area of the following 'species' must be considered at best speculative to doubtful, at worst spurious:

Gelidium arbuscula
asperum
attenuatum
canariensis [*cartilagineum* var. *canariensis*]

cartilagineum
clavatum
corneum
crinale
elminense
flaccidum
foliosum
latifolium
melanoideum
microdon
micropterum
pristoides
pulvinatum
pusillum
reptans
spathulatum
spinulosum
versicolor

The numerous varieties described in many of the above, where not directly reflected in use by some authors at species level of names used by other authors at infraspecific levels, also require rationalisation.

Amongst the above, the names *canariensis* (q.v.) and *versicolor* [previously *cartilagineum*] (q.v.) are perhaps the least likely to reveal anomalous application, whilst *Gelidium sesquipedale* (q.v.) has been omitted entirely from the list. *G. sesquipedale* is perhaps the least variable species in the genus and therefore the least likely name to be misapplied. Such confusion as exists about it has largely resulted from the involvement of *Fucus corneus* Hudson [*Gelidium corneum* auct.] in the situation, since *F. corneus* of Hudson has been shown (Dixon, 1967) to be based on Buddle (BM) specimens that proved to be *G. sesquipedale*. Hence, as a corollary, derives further confusion about the significance and application of the epithet *corneum* (q.v.).

Gelidium apiculatum Kützing

Note. See *Gelidium spinulosum* (C. Agardh) J. Agardh, for which this is a possible synonym, and the note to *Gelidium microdon* Kützing.

Gelidium arbuscula Bory ex Børgesen
Canaries (306B; 582; 598).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Tropical Africa (N. Gambia – Congo river)' (598).
[As *Gelidium arbuscula* (Montagne) Børgesen]
Canaries (2; 229; 269; 270; 351; 374; 393; 394; 486; 490; 529; 567).
Côte d'Ivoire (287; 586).
Guinée (350; 586).
Mauritanie (59).
Sénégal (59; 123; 483; 586).
'remonte du Sénégal jusqu'à la Mauritanie.' (59).
'warm temperate and tropical parts of the eastern Atlantic Ocean.' (350; 586).
[As *Gelidium arbuscula* Bory]
Canaries (4; 5; 68; 191; 227; 379; 489; 493; 547; 581).
Guinea-Bissau (529).
Guinée (529).
Sénégal (122; ?529; ?530; ?531).
[As *Gelidium arbuscula* (Bory) Montagne]
Canaries (253; 583).
Sénégal (253).

[As *Gelidium corneum* (Hudson) Lamouroux var. *nereideum*? Lightfoot]
Canaries (401).

Note. See Børgesen (68: 85–89) for details of the taxon and its background to 1927. Many of the above records involve considerable doubt as to their accuracy. All Sourie's (529; 530; 531) publications mentioned that doubt; Feldmann, who reviewed Sourie's material from Sénégal, was said by Sourie (529: 116) to have considered specimens of this species 'assez différents de la plante des Canaries'. Essentially the same message lies behind the Bodard & Mollion statement (59: 198) that their Sénégal plants represented 'une endémique possible que Dangeard avait appelée *Gelidium arbuscula* et qui semble plutôt une espèce nouvelle que J. Feldmann nous a fait remarquer.' Feldmann had earlier (191: 414) expressed the opinion that (for the Canary Islands) 'Le *Gelidium arbuscula*, endémique bien caractérisé, peut néanmoins être rapproché du *Gelidium sesquipedale*, espèce lusitano-africaine.' Acuña González (2: 3), also concerned with Canary Islands plants, commented that there 'también existen algunas [especies] que son endémicas, como. . . . *Gelidium arbuscula*'. It therefore seems a reasonable possibility that at least two separate entities are concealed within the application of this name in the list area; it may be possible partly to utilise ecological characteristics in distinguishing the entities – Santos, Acũna & Wildpret (490) indicated that what they called *Gelidium arbuscula* had an 'especial predilección por los acantilados verticales [vertical or steep cliffs]'.

The record (401) in Montagne is included here on the basis of Børgesen's comment (68: 86) that *G. arbuscula* Bory in herb. 'seems to be a rather common species at the [Canary] Islands. . . . further, according to a specimen in Herb. Montagne, the *Gelidium corneum* var. *nereideum*, too, is this plant'. See also the note to *Gelidium* as genus. Haroun Tabraue et al. (583: 111) commented that [on Gomera]: '*Gelidium arbuscula* is easily recognisable by its purple coloured thalli, which clearly contrast with the brown-yellow of *Cystoseria abies-marina* [amongst which it grows] and the blackish colour of *Gelidium versicolor*.' (Translation from the Spanish.) On p. 112, they added yet another difference – the greater rigidity of *G. versicolor* (q.v.).

Gelidium asperum Montagne

Note. See *Gelidium spinulosum* (C. Agardh) J. Agardh. The present name is probably a manuscript name appearing only on a specimen in the Herb. Montagne (PC); in any case, it appears much like *Gelidium microdon* Kützing, itself probably a synonym of *G. spinulosum*. Data also appear in Børgesen (68: 90).

Gelidium attenuatum (Turner) C. Agardh
See *Gelidium latifolium* (Greville) Bornet in Bornet & Thuret.

Gelidium caespitosum Kylin

Note. This name was originally applied by Fox to BM specimens from Ghana (April 1952) and from Nigeria (March and November 1954); the records were subsequently published by her (1957) under the name *Gelidium pusillum* (Stackhouse) Le Jolis. Specimens were afterwards reassigned by Lawson & John (350) to *Gelidium corneum* sensu Børgesen.

Gelidium canariensis (Grunow) Seoane-Camba
Canaries (518; 598).
[As *Gelidium versicolor* (S. Gmelin) Lamouroux]
Canaries (172; 180; 227; 253; 352).
[As *Fucus versicolor* Gmelin]
Canaries (90).

Note. The taxon was recorded as both *Fucus cartilagineus* L. and *Fucus versicolor* Gmelin by Bory (90), who also (90: 304) stated the former to be a synonym of the latter. The alga was said to be: 'Très comun sur toutes les pierres et les roches de la rade de Sainte-Croix.'. De Toni (131: 152 et seq.) also placed *G. cartilagineum* in the synonymy of *G. versicolor* Lamouroux.

[As *Fucus cartilagineus* L.]
Canaries (90).

Note. See the note above, to *Fucus versicolor* Gmelin.

[As *Gelidium cartilagineum* (L.) Gaillon]
Canaries (25; 68; 81; 89; 131; 170; 229; 254; 269; 305; 318; 351; 386; 393; 394; 401; 482; 486; 489; 490; 567).

Note. The records in Montagne (401: 158), J. Agardh (25), and De Toni (131) are based on Bory's (90) data.

[As *Gelidium cartilagineum* var. *canariense* Grunow in Piccone or var. *canariensis* Grunow in Piccone]
Canaries (68; 131; 191; 439; 482; 489; 567; 581).
[As *Sphaerococcus cartilagineus* (L.) C. Agardh]
Canaries (19).
Note. Recorded by C. Agardh (19: 286–288) as 'Ad insulas Canarias; sec. *Bory Voy.*'
[As *Gelidium cartilagineum* Gaillon]
Canaries (44; 385; 493).
Note. The record in Benítez (44) is directly based on Montagne (401). That in von Martens (385) is based (385: 38) on a record of Mertens, from Tenerife.
[As *Gelidium cartilagineum* (L.) Greville]
Canaries (37; 242).
[As *Corallina rubens* Tournefort]
Canaries (548).
Note. For explanation of attribution of this record, see the notes to *Jania rubens* (L.) Lamouroux.
[As *Gelidium cartilagineum* Greville]
Canaries (493).
Note. See the entry for *Gelidium versicolor* (S. Gmelin) Lamouroux for records from other geographical areas. The rationale for recognition of *Gelidium canariensis* is documented in the notes to *G. cartilagineum* (L.) Gaillon.

Gelidium capillaceum Kützing [or (S. Gmelin) Kützing]
See *Pterocladia capillacea* (S. Gmelin) Bornet & Thuret.

Gelidium cartilagineum (L.) Gaillon
See *Gelidium canariensis* (Grunow) Seoane-Camba and *Gelidium versicolor* (S. Gmelin) Lamouroux.
Note. The name *Gelidium cartilagineum* (L.) Gaillon has to be rejected for that genus since it was based on material that has proved to be representative of the genus *Plocamium* (Dixon, 1967). Thus, the southern African species of *Gelidium* to which the epithet had largely by custom been applied required another name, the earliest available being shown by Dixon (1967: 58) to be *Gelidium versicolor* (S. Gmelin) Lamouroux, based on *Fucus versicolor* of Gmelin (1968).
The most northerly attached records of the taxon to which the name *G. versicolor* (S. Gmelin) Lamouroux is thus to be applied are from the Canary Islands (Dixon, 170: 47, and subsequent publications, especially 172: 134). For that same area, Seoane-Camba (518) recently concluded that materials from 'mainland' Spain and from the Canary Islands were sufficiently different to represent distinct taxa, despite hitherto having been collectively called *Gelidium cartilagineum* (i.e. correctly *G. versicolor*). He raised the var. *canariensis* Grunow of *G. cartilagineum* to specific status as *Gelidium canariensis* (Grunow) Seoane-Camba; all previous Canaries records are here transferred to that latter species entry, although material behind all the earlier records has not been checked to confirm their validity. Previously, J. Feldmann (191: 414) had considered (without effecting it) that the Canaries material of then so-called *Gelidium cartilagineum* was 'répresenté par une variété endémique (var. *canariensis*) assez différente du type pour mériter peut-être d'être considérée comme une espèce distincte. Le *G. cartilagineum* type est une espèce indo-pacifique, très abondante en particulier en Afrique du Sud et en Californie.' See also the general note to *Gelidium*.

Gelidium claviferum Kützing
See *Gelidiella acerosa* (Forsskål) J. Feldmann & Hamel.

Gelidium corneum sensu Børgesen
Canaries (486).
Gabon (350; 586).
Gambia (350; 586).
Ghana (350; 377; 586).
Liberia (350; 586).
Nigeria (350; 586).
Togo (350; 586).
'widespread in boreal-antiboreal to tropical parts of the Atlantic Ocean.' (350; 586).

[As *Gelidium corneum* (Hudson) Lamouroux]
Angola (352).
Canaries (66; 401).
Gabon (294).
Gambia (296).
Ghana (288; 491).
Liberia (129; 288).
Nigeria (288).
Togo (288).
'in [wärmeren] atlantischen [Ocean]' (504).
'warmer parts of the Atlantic Ocean' (60).
[As *Gelidium corneum* (Linn.) Lamour.]
Canaries (331; 332).
[As *Gelidium corneum* (Turner) Lamouroux]
Canaries (68; 71; 499).
Cape Verde Islands (499).
'Nordwestafrika' (499).
'Westafrika' (499).
'[Madeira, but] . . . probably widely distributed.' (375).
'Seems to be widespread.' (68).
[As *Gelidium corneum* (Lamouroux)]
Canaries (196).
[As *Gelidium corneum* Lamouroux]
Angola (41; 42).
Canaries (44; 547).
Cape Verde Islands (38; 223; 578; 596).
'Throughout all oceans.' (410).
[As *Gelidium corneum* Hudson]
Cape Verde Islands (145).
[As *Gelidium corneum* [sensu – as vgl.] Feldmann et Hamel]
Angola (500).
[As *Gelidium arbuscula* Bory]
Liberia (286).
Togo (293).
[As *Gelidium pusillum*]
Nigeria (213).
[As *Sphaerococcus corneus* (Hudson) C. Agardh]
Canaries (19).

Note. C. Agardh (19: 279–285) recorded the 'parent' species as 'Ad Teneriffam; Bory'. He also recognised 17 varieties/subspecies, mostly with names still employed somewhere in *Gelidium*. Amongst those is *β. sesquipedalis*, recorded from the Mediterranean and Cádiz. The Bory record and the significance of this *S. corneus* entry will need careful rationalization.

[As *Fucus corneus* L.]
Canaries (90).

Notes. See the note at *Sphaerococcus corneus* (Hudson) C. Agardh subhead, above.

General notes. For records under names often attributed as varieties of *Gelidium corneum* (Hudson) Lamouroux, refer as follows in this work:

var. *capillaceum* (S. Gmelin) C. Agardh
Pterocladia capillacea (S. Gmelin) Bornet et Thuret
var. *clavatum* (Lamouroux) C. Agardh
Gelidium pusillum (Stackhouse) Le Jolis
var. *crinale* (Turner) C. Agardh
Gelidium crinale (Turner) Desmazières
var. *nereideum*? Lightfoot
Gelidium arbuscula Bory ex Børgesen

var. *pinnatum* (Hudson) Montagne
Pterocladia capillacea (S. Gmelin) Bornet & Thuret
var. *sesquipedale* Clemente
Gelidium sesquipedale (Clemente) Thuret in Bornet & Thuret
var. *spinulosum* C. Agardh
Gelidium spinulosum (C. Agardh) J. Agardh.

Amongst the attributive 'species' so involved, some (e.g. *G. pusillum*, *G. crinale*) are often considered as conspecific (e.g. by Wynne, 1986).

Records established under the name *Gelidium corneum* in most cases present considerable interpretive problems, whatever authorities have been quoted for the combination. *G. corneum* represents perhaps the classic extreme of general confusion. Overlying all that is the fundamental difficulty of typification of the basionym *Fucus corneus* of Hudson. For general background to nomenclatural and morphological problems with this taxon, see Dixon (1967), together with the notes to the entries here for the genus *Gelidium* and for *Gelidium sesquipedale* (Clemente) Thuret in Bornet & Thuret. The name as utilized at present for the list area is only in the sense applied by Børgesen (68: 85), and even that brings with it the need for a complete revision of whatever backing material is available for all the records involved. Therefore, what we offer here is merely a statement of rationalization through what others have said, not of what we conceive as taxonomic/nomenclatural truth, even assuming the latter to be approachable. If Børgesen's taxon does finally turn out to be a good one, it will require whatever is the earliest available name, or a new one, as the case may be. At presents *corneum* as an epithet is completely confused in all respects.

It is clear that even the reduction of the general chaos of names/taxa in *Gelidium* to the two aggregates '*latifolium*' and '*pusillum*' (leaving aside for now the more extreme morphologies of *G. versicolor*, q.v., and *G. sesquipedale*, q.v.), as has been suggested by Dixon & Irvine (172: 126 et seq.) leaves a plethora of problems in that these two aggregates are themselves not satisfactorily morphologically distinguishable apart at all times and from all locations; the artificial key presented in 172: 127 admits as much from the statement that it 'should be used with caution', and from the nature of the distinguishing characteristics provided. Since the epithet *corneum* has variously been applied, and conceptually recognized as applying, for our area to forms that could be placed in either or both of the aggregates, the point made by Lawson & John (350: 177) regarding Fox's (213) Nigerian plants reported as *G. pusillum* being more closely related to *G. corneum* sensu Børgesen may have relatively little overall significance, although morphologically accurate for their material at that time.

As observed by Seagrief (570), some applications of the name *corneum* (those sensu Harvey) for material from Sea Point, South Africa, do not represent *Gelidium corneum* (Hudson) Lamouroux (nor, apparently, *Gelidium corneum* sensu Børgesen), but are attributed to *Gelidium micropterum* Kützing (q.v.). On the basis of BM holdings of material collected during the *Iter Benguellense* of F. Welwitsch [those specimens circulated under the numbers 73 (Benguela); 74 (Moçamedes); 75 (drift, from near Benguela)], it seems highly likely by comparison with the illustration presented by Kützing (326: 21, Tab. 59 (4137), 1868) that this attribution to *Gelidium micropterum* Kützing is also true for at least some material from Angola. It probably equally applies for the coast of Namibia, whence *Gelidium micropterum* Kützing has been firmly reported. There has, however, been doubt about the way in which the name *micropterum* Kützing has been applied in Namibia; it has been suggested that *Gelidium pristoides* (Turner) Kützing was perhaps involved. For some of the supposed distinctions between *G. corneum* and *G. micropterum*, see P. S. Rao (1970: 71–73).

Material recorded by Lawson, John & Price (352: 311), from Angola, as patches of short red algal 'turf' of *Gelidium corneum* (Hudson) Lamouroux, included a mixture of forms that, in isolation, would have been considered as representing variously *G. corneum* sensu Børgesen, *G. pusillum* (Stackhouse) Le Jolis, and *Gelidium micropterum* Kützing.

All the above complications are, of course, compounded by varying local traditions of epithet application in *Gelidium* such that, other than generic validity, the use of an epithet in one country or region may present no biogeographic information in any way of use for another area. This is so for most of the epithets of other than very local application and markedly so for '*corneum*'.

Gelidium coronopifolium (Goodenough & Woodward) Lamouroux
See *Sphaerococcus coronopifolius* (Goodenough et Woodward) Stackhouse.

Gelidium crinale (Turner) Desmazières
Gabon (350; 586).
Gambia (296; 350; 586).

Ghana (350; 586).
Liberia (350; 586).
Mauritanie (349).
São Tomé (350; 586).
Sierre Leone (350; 586).
Western Sahara (349; 476).
[As *Gelidium crinale* (Turner) Lamouroux]
Angola (352).
Canaries (2; 68; 108; 118; 191; 214; 252; 486; 517; 546; 547; 584).
Gabon (294).
Ghana (152; 338; 491; 535).
Guinée-Française (529).
Liberia (129).
Mauritanie (252; 500; 535).
Salvage Islands (38B; 231; 375).
São Tomé (251; 265; 535).
Sénégal (33; 121; 122; 529).
Sierra Leone (30; 295).
'Atlantic coast of Europe, N. Africa and N. America' (375).
'Atlantico de Inglaterra a Canarias' (517).
'Atlantique (de l'Angleterre aux Canaries, Cap Vert . . .)' (33).
'English coast to the Canary Is.' (68).
'Gulf of Guinea' (269).
'in [wärmeren] atlantischen Ocean' (504).
'répandu dans toutes les mers chaudes' (188).
[As *Gelidium crinale* Lamouroux]
Canaries (547).
[As *Gelidium crinale* Lamouroux in Bory]
Canaries (89).
'D'Angleterre aux Canaries' (89).
[As *Gelidium corneum* (Huds.) Lamour. var. *crinale* (Turner) C. Agardh]
Canaries (401).
[As *Gelidium crinale* (Thuret) Lamouroux]
Sénégal (530).

Note. The epithet rendering in Primo (476: 23) is as '*orinale*', a purely typographic error that has been ignored. It is now generally accepted that Lamouroux, despite employing the combination *G. crinale* (in Bory, *Dict. class. d'Hist. nat.* **7**: 191 (1825)), presented neither basionym data and source, nor descriptions of the taxon, thus not effecting a proper transfer; the first to achieve correct recombination of Turner's epithet *crinale* in *Gelidium* was Desmazières.

Opinions on this taxon and the often-confused *Gelidium pusillum* (Stackhouse) Le Jolis have varied widely, from absolute synonymy to at least usage in very different and identifiable senses. Except where both the concepts used and the mode of application of the names have both been entirely clear and consistent, the possible equivalence of *G. crinale* with *G. pusillum* agg. has not been here taken as accepted. Names are therefore otherwise maintained as used by the publishing author, but it should be borne in mind that, given reasonable consistency of view and application, it is strongly likely that many records under the two names represent the same taxon. See also the entry for *G. pusillum* (Stackhouse) Le Jolis.

Gelidium elminense Dickinson
Côte d'Ivoire (288; 350; 586).
Ghana (152; 288; 350; 586).
'in tropical parts of the eastern Atlantic Ocean.' (350; 586).
'Tropical Africa (N. Gambia-Congo river)' (598).

Note. This species was originally described on the basis of plants from Elmina and Iture, both Ghana, collected in April 1945 (25th and 26th, respectively). According to Lawson & John (350; 586), the species falls within the *Gelidium crinale* complex sensu Dixon. From her own comments in the original description

(152: 43), Dickinson was markedly reluctant to indulge in describing yet another new species in an already ill-understood and cluttered genus, but could see no other way out of such a tediously complex situation.

Gelidium flaccidum P. Dangeard
Guinea-Bissau (529).
Mauritanie (121).
Sénégal (121; 122; 529).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).

Note. In publishing the original description of *G. flaccidum*, Dangeard (121: 23) noted that 'La coupe transversale de la fronde montre la grande rareté des rhizines. Par ce caractère ce *Gelidium* se rapproche du *G. melanoideum*.'

Gelidium foliosum P. Dangeard
Mauritanie (121).
Sénégal (50; 121; 122; 123; 529).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).

Note. In the process of describing new taxa from Sénégal and Mauritanie, Dangeard (121: 22) stated that 'Deux espèces enfin de *Gelidium* [*G. flaccidum*; *G. foliosum*] de ses régions sont nouvelles et bien caractérisées'. Despite that, he went on to state [in both cases of *G. foliosum*]: 'rappelle un peux le *Gelidium pusillum* var. *pulvinatum*' and, later: 'ressemble un peu par son port au *G. galapagense* décrit par R. TAYLOR [sic!] (1945)'. He added that *G. foliosum* 'il en diffère par ses ramules à tétrasporanges rétrécis à la base et comme pédicellés.'

The resemblance to *Gelidium pusillum*, especially var. *pulvinatum*, seems to have been too close for many workers to take the present taxon seriously. Soon after *G. foliosum* was published, Sourie (529: 289 and footnote 1) commented: 'Selon J. Feldmann (opinion inedité), ce *Gelidium* [*foliosum*] pourrait n'être qu'une forme de *G. pusillum*.' Even Bodard (50) doubted the validity of it, stating: 'Je pense que le *Gelidium foliosum* ne peut être considére que comme une variété de *Gelidium pusillum*'. He did not give reasons for this opinion. More recently, one of us (DMJ) annotated a collection (John & Seku; no. 6949) from Harper, Liberia, 2 Jan. 1972, determined as *Gelidium pusillum* var. *pulvinatum*, 'Similar to description of *G. foliosum* by Dangeard (121: 22) from Sénégal'.

Gelidium galapagense W. Taylor
See the entry to *Gelidium foliosum* P. Dangeard.

Gelidium intricatum Kützing
See *Gelidiopsis intricata* (C. Agardh) Vickers.

Gelidium latifolium (Greville) Bornet & Thuret
Canaries (253; 306B; 598; 604).
Cape Verde Islands (598).
Sénégal (59).
Western Sahara (253; 349; 393; 394).
'Atlántico (Noruega – Rio de Oro)' (604).
'Atlántico Oriental (Noruega – Rio de Oro)' (253).
'Atlantique: depuis les côtes anglaises jusqu'au Rio de Oro' (222).
'Nordwestafrika' (499).
'Southern Norway to Rio de Oro' (172).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Tropical Africa (N. Gambia – Congo river)' (598).
[As *Gelidium latifolium* (Greville) Thuret & Bornet]
Sénégal (59; ?529).
'Atlantic Ocean (European and African coasts, Canary Islands)' (177).
'Atlantique (de l'Angleterre au Rio de Oro)' (33).
[As *Gelidium latifolium* Bornet]
'Atlantic Ocean: . . . African coast.' (566).
[As *Gelidium attenuatum* (Turner) C. Agardh]
Western Sahara (393; 394; 476).

Note. Despite the convenient recognition, in some parts of the world, of the contrasting morphologies of the 'species aggregates' known as *G. latifolium* and *G. pusillum*, it is by no means certain that the two

groups do not represent merely extremes of a morphological cline representing environmental or racial characteristics within the range of expression of a single genome. Haroun Tabraue et al. (253: 259) referred to their Canary Islands report as: 'nueva para el Archipiélago Canario.' Dangeard (117; 118: 184–5) had previously stated that *Gelidium attenuatum* was missing from the Canaries. It remains to be shown whether this and the other records above are significant or not. The expression of difficulty in determination and doubt occurs throughout many of the comments associated with records: Gayral (222: 373) indicated the wide range in morphology of the 'species', from 'var. *luxurians*' (wide branches; distichous) to 'var. *hystrix*' (cylindrical; minor laterals spiralled on axes), with all kinds of intermediates. Sourie (529) recorded his determination as doubtful, though the reason for doubt is not clear. Perhaps the extreme in confusion over this taxon was shown clearly by Dixon (170: 47), who revealed previous misdetermination as *Gelidium sesquipedale* (Clemente) Thuret in Bornet & Thuret (q.v.) of 'the entity known as *G. attenuatum*'; *G. sesquipedale* is one of the few species in the genus with a very characteristic appearance. Two of us (Lawson & John, 349) were unable to find material in Western Sahara; our record is based on previous comments, of which the only original one is probably that in Primo (476).

Gelidium melanoideum Schousboe ex Bornet
Sénégal (52; 529).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania Former W. Sahara]' (598).
[As *Gelidium melanoideum* var. *pseudopulvinatum* J. Feldmann]
Sénégal (529).

Note. For an analysis of characteristics that distinguish between *G. melanoideum* and the *Gelidium crinale/G. pusillum* complex, see Dixon & de Valera (1961). The species, originally recognised from the Tangier region, is principally of Mediterranean origin. See also the note to *Gelidium flaccidum* P. Dangeard.

Gelidium microdon Kützing
Western Sahara (349; 393; 394).
'Atlantique (. . . Canaries . . .)'. (33).
[As *Gelidium spinulosum* (C. Agardh) J. Agardh]
Western Sahara (476).

Note. It is possible that the taxa *G. microdon* and *G. spinulosum* may be wholly conspecific, in which case the above records should all appear under the latter, being the older valid name. Ardré (33: 68), Bornet (89: 112 [272]) and Børgesen (68: 90) all comment on conspecificity of these taxa; Bornet is the most unequivocal in his opinion, whilst Ardré suggests conspecificity and Børgesen merely quotes Bornet's comments, under his heading of *G. spinulosum* (C. Agardh) J. Agardh. See also *Gelidium asperum* Montagne. Bornet's comment was: 'Les *Gelidium apiculatum* Kütz. . . . et *microdon* Kütz. . . . qui sont figurés d'après des échantillons de Tanger et de Cadix, ne sont que des formes de cette espèce.' 'Cette espèce' refers to the entry under which the statement appears, *Gelidium spinulosum* J. Agardh.

The record above in 349 is based only on Michanek (393; 394) and Primo (476), Lawson & John not themselves having detected specimens.

Gelidium micropterum Kützing
Namibia (348; 522; 522A).
Sénégal (121; 122).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
[As *Gelidium corneum* (Hudson) Lamouroux]
Angola (352).

Note. The Lawson & Isaac (348) record from Namibia was based directly on the data from 522 (Simons), since they did not locate material. Applications of the epithet *micropterum*, the concept behind the taxon, and any synonymy involved are all highly complex and opinions on the matter have varied greatly. For a detailed consideration of some aspects of this, see the notes to *Gelidium corneum* sensu Børgesen as regards South Africa, Angola, and Namibia. *Gelidium pristoides* (Turner) Kützing (q.v.) is often considered to be involved, whilst De Toni (131: 152 et seq.) placed *G. micropterum* (albeit with '?') in the synonymy of *Gelidium cartilagineum* (L.) Gaillon [now *Gelidium versicolor* (S. Gmelin) Lamouroux or *G. canariensis* (Grunow) Seoane-Camba].

Gelidium pannosum Bornet
See *Gelidiella tenuissima* J. Feldmann & Hamel.

Gelidium pannosum Grunow
See *Gelidiella tenuissima* J. Feldmann & Hamel.

Gelidium pectinatum Montagne
Canaries (68: 191; 392; 547; 584).
'Ad . . . litora Africae borealis' (318).
[As *Gelidium pectinatum* (Schousboe) Montagne]
Canaries (177; 227).

Note. Børgesen (68) knew of a single specimen found in the Canaries; he had not seen it. Citations of authorities that include the name of Schousboe are in error (as, e.g., in Boudouresque et al., 1984). The form used by the latter, 'Schousboe ex Montagne', is inaccurate since Montagne (403: 108) did not use the whole of the name by which Schousboe had referred to the taxon (*Teloedema pectinatum* Schousboe) on a specimen in Webb's herbarium.

Gelidium pristoides (Turner) Kützing
Namibia (348).

Note. See the notes to *Gelidium micropterum* Kützing and to *Gelidium corneum* sensu Børgesen. There has been past suggestion that *Gelidium pristoides* and *Gelidium corneum* auct. are directly related taxa; Montagne (404: 77), for example, referred to *pristoides* as 'variété *pristoides* du *G. corneum*', having more or less contemporaneously (403: 108) included '*Sphaerococcus corneus* var. *pristoides* C. Ag.' in the synonymy of his *Gelidium pectinatum*. *Gelidium pristoides* is widely and abundantly reported for many localities in South Africa (Simons, 523: 259; Carter & Anderson, 579: 117; and others), so that whatever the real status of the morphology to which the name is applied, it occurs often in the general area here considered. A recent treatment of all non-parasitic genera of Gelidiaceae founded primarily on surface cell morphology (Akatsuka, 1986) resulted in the establishment of a new genus, *Onikusa*, to include both *Gelidium pristoides* (Turner) Kützing (the type species of *Onikusa*) and *Gelidium japonicum* (Harvey) Okamura. *Onikusa* is derived from the Japanese name for *G. japonicum*. Since the study affects also the entries for other genera of Gelidiaceae (*Pterocladia*; *Suhria*) found in the list area, it will be dealt with fully later.

Gelidium pulchellum (Turner) Kützing
Gambia (296).
Sénégal (121; 122).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
[As *Gelidium pulchellum* var. *claviferum*]
Canaries (38C).
Salvage Islands (38C).

Note. It is commonly the case with most authors that *Gelidium pulchellum* is taken to be a synonym of *Gelidium pusillum* (Stackhouse) Le Jolis (q.v.), or at least to fall morphologically within the range taken to represent the '*Gelidium pusillum-G. crinale-G. pulchellum* series' (see John & Lawson, 296: 289–290). Boudouresque et al. (1984: 44) and Wynne (1986) both believed at least *pulchellum* and *pusillum* to be synonymous, Boudouresque et al. further not distinguishing for the latter the var. *pulvinatum* (C. Agardh) J. Feldmann. Audiffred (38C: 173) cited the records from Canaries and Salvage Islands only in the context of the entry for *Ceramium echionotum* J. Agardh, the 'host'. The species list provided in the same publication included only *Gelidium pusillum* Stackhouse) Le Jolis, perhaps tending to imply that a nomenclatural and taxonomic change had been overlooked.

Gelidium pulvinatum (Kützing) Thuret ex Bornet
Canaries (68; 490).
[As *Gelidium pulvinatum* Thuret]
Canaries (493).

Note. Børgesen (68) found no specimens of this form amongst Canaries material, but it was listed by Sauvageau (493). It seems probable (Børgesen, 68) that *G. pulvinatum* is closely related to *G. pusillum* (q.v.) and *G. spathulatum* (q.v.), all being forms of a single species. Schmidt (497: 110–111) relegated *Gelidium pulvinatum* Kützing to *Gelidium pusillum* f. *pulvinata* (Kütz.), a process initially carried out by J. Feldmann (in Hamel, 1927) on the basis of C. Agardh's (19: 284) *Sphaerococcus corneus* o. *pulvinatus*.

Gelidium pusillum (Stackhouse) Le Jolis
Angola (352).
Ascension (?474; 475; 567).

Benin (288; 293; 350; 586).
Bioko (346; 350; 586).
Cameroun (269; 288; 337; 350; 374; 454; 460; 484; 500; 537; 586).
Canaries (13; 16; 38B; 38C; 38D; 68; 70; 71; 108; 128A; 191; 226; 227; 229; 236; 237; 253; 306B; 336; 351; 375; 379; 392; 486; 497; 499; 517; 556; 584; 585; 598; 604; 605; 608).
Cape Verde Islands (213).
Côte d'Ivoire (287).
Gabon (213; 350; 586).
Gambia (350; 586).
Ghana (213; 288; 297; 350; 377; 491; 586).
Liberia (129; 287; 288; 350; 586).
Mauritanie (38B; 38C; 38D; 349; ?529; 556).
Salvage Islands (38B; 38C; 38D; 231; 375; 556; 556A; 598).
São Tomé (288; 350; 586).
Sénégal (38B; 38C; 38D; 59; 121; 213; 253; 336; 529; 556).
Sierra Leone (30; 213; 295; 336; 339; 350; 374; 378; 586).
Togo (288; 293; 350; 586).
Western Sahara (38B; 38C; 38D).
'Atlàntico (Noruega – Cabo Verde. . . .)' (253; 604).
'Atlantique (de l'Angleterre aux Canaries)' (33).
'Atlantischer Ozean, von den englischen Küsten an südwarts bis zur afrikanischen Küste und den Kanaren' (499).
'Central Norway to Cape Verde' (172).
'extensive in warm & tropical seas' (81).
'Nordwestafrika' (499).
'Semble être répandu dans toutes les mers chaudes' (188).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Tropical Africa (N. Gambia – Congo river)' (598).
'Tropical West Africa' (611).
'Von den englischen Küsten an sudwarts bis zur afrikanischen Küste' (497).
'Westafrika' (499).
[As *Gelidium pusillum* var. *pulvinatum* (C. Agardh) J. Feldmann]
Angola (352).
Canaries (518; 519; 584).
Gabon (294).
Gambia (296).
Liberia (129; 287; 288).
Mauritanie (349).
Sénégal (121; 122; 529).
Sierra Leone (295).
[As *Gelidium pusillum* (Stackhouse)]
Canaries (5).
[As *Gelidium pusillum* Le Jolis]
Canaries (547).
[As *Gelidium pusillum* (Stark) le jolis var. *pulvinatum* (Ag.) Feldm.]
Sénégal (50).
[As *Gelidium pusillum* var. *conchicola* Picc. & Grun.]
Sénégal (121; 122; 529).
[As *Gelidium pusillum* var. *minusculum* Weber van Bosse]
Sénégal (121; 122; 529).
[As *Gelidium crinale* (Turner) Lamouroux]
Mauritanie (252; 500; 535).
Western Sahara (476).

[As *Gelidium reptans* (Suhr) Kylin]
Mauritanie (121; 122).
Namibia (348).
São Tomé (93; 535).
Sénégal (121; 122; 296; 529).
[As *Gelidium corneum* (Hudson) Lamouroux]
Angola (352).
[As *Gelidium corneum* (Hudson) Lamouroux var. *clavatum* (Lamouroux) C. Agardh]
Canaries (401).

Note. According to P. S. Dixon (pers. comm., 1974), the taxon *Gelidium pusillum* (Stackhouse) Le Jolis var. *pulvinatum* (C. Agardh) J. Feldmann should correctly be known as *Gelidium crinale* (Turner) Lamouroux. Although *Gelidium reptans* (Suhr) Kylin has been recorded from Mauritanie, Namibia, São Tomé, and Sénégal, and tentatively from Gambia, we here follow Børgesen (81) and others in considering it as no more than a variety of *Gelidium pusillum*. Sourie (529: 116), in commenting on material collected and recorded as *G. reptans*, stated 'les exemplaries récoltés ne seraient peut-être qu'une forme de *G. pusillum*'. There is a similarly close relationship between *G. foliosum* of P. Dangeard and *G. pusillum* var. *pulvinatum*, as indicated by John (288); see also the notes in the entry for *G. foliosum*. Material recorded by Lawson, John & Price (352) from Angola as patches of short red algal 'turf' of *G. corneum* (Hudson) Lamouroux included a mixture of forms that, in isolation, would have been considered as representing *G. corneum* sensu Børgesen, *G. pusillum* (Stackhouse) Le Jolis and *G. micropterum* Kützing (q.v.).

Gelidium reptans (Suhr) Kylin

Note. See *Gelidium pusillum* Stackhouse) Le Jolis, especially the note to that species entry.

Gelidium rigidum (Vahl) Greville [or simply Greville]
See *Gelidiella acerosa* (Forsskål) J. Feldmann & Hamel.

Gelidium senegalensis Bodard (nomen) [or J. Feldmann mscr.]
Sénégal (59).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
[As *Gelidium senegalensis* J. Feldm. mscr.]
Sénégal (59).

Note. Included for completeness only, since no description or further data have been traced, and the relationships of material to which the name has been applied are not clear. Bodard & Mollion (59) included the form of the name used as heading here in their Table I (Baie de Gorée), without description or further mention in the text. Later, in their Table IIIB, they referred to what must be taken as the same taxon as '*G. senegalensis* J. Feld. mscr.' The name was presumably annotated on to a specimen or specimens by Feldmann and taken up temporarily by Bodard.

Gelidium serrulatum J. Agardh
[As *Gelidium serrulatum* Ag. var.]
Angola (261; 262).

Note. Originally described from Venezuela and known from Trinidad. Accepted by Taylor (540: 357) without comment, but not frequently employed as a name in the literature. Relationships of the material here involved are not clear.

Gelidium sesquipedale (Clemente) Thuret in Bornet & Thuret
Canaries (68; 117; 139; 191; 227; 598).
Cape Verde Islands (122; 252; 598).
Guinea-Bissau (529).
Mauritanie (121; 122; 500; 529).
Sénégal (122; 252).
Western Sahara (393; 394; 476; 529).
'de Inglaterra a Canarias' (517).
'does not extend [southwards] into Gulf of Guinea' (487).
'English coast southwards to Canary Islands' (68).
'French Channel coast to Mauretania' (172).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Südengland bis Mauritanien.' (567).

[As *Gelidium sesquipedale* (Clemente) Bornet & Thuret]
Mauritanie (349).
Western Sahara (349).
[As *Gelidium sesquipedale* (Turner) Thuret in Bornet & Thuret]
'D'Angleterre aux Canaries' (89).
[As *Gelidium sesquipedale* (Turner) Thuret]
Cape Verde Islands (191; 423).
Mauritanie (252).
'Atlantique: . . . sur les côtes anglaises et descend jusqu'à la pointe du Cap Blanc, en Mauritanie.' (222).
'Atlantique (de l'Angleterre à la Mauritanie' (33).
'du sud de l'Angleterre à la Mauritanie' (195).
[As *Gelidium sesquipedale* Thuret in Bornet & Thuret]
'dall' Inghilterra alle Canarie' (390).
[As *Gelidium sesquipedale* Thuret]
Canaries (117; 118).
Cape Verde Islands (38).
'De l'Angleterre aux Canaries.' (38).
[As *Gelidium resquipedalex*]
Canaries (237).
[As *Gelidium corneum* Lamouroux var. *sesquipedale* J. Agardh]
Cape Verde Islands (38).
'De l'Angleterre aux Canaries' (38).
[As *Gelidium corneum* (Hudson) Lamour. var. *sesquipedale* Clemente]
Canaries (401).
[As *Gelidium corneum* (Hudson) Lamouroux var. *sesquipedale* Agardh]
Cape Verde Islands (408).
[As *Gelidium corneum* (Hudson) Lamouroux var. *sesquipedale* Greville]
Canaries (141A).

Note. Børgesen did not find this species on the Canaries; he had only two previous records, from Montagne (401: 158) and from the herbarium of H. C. Lyngbye. He therefore referred to the species there as 'probably rare'. Although the Western Sahara record in Lawson & John (349) is supported by an original discovery from the Cap Blanc area, the statement for Mauritanie is secondary, being based on various of the data included here. See also the notes to *Gelidium arbuscula* Bory ex Børgesen.

Gelidium spathulatum (Kützing) Bornet
Canaries (16; 68; 191; 375; 517; 584).
'Atlantique (de l'Angleterre aux Canaries . . .)' (188).
'Atlantique (du golfe de Gascogne aux Canaries)' (33).
[As *Gelidium spathulatum* Kützing]
Canaries (493).

Note. Bornet (89: 108 [268]) suggested that this taxon covered a form of *G. crinale* (q.v.), not a good and separate species. Børgesen (68) expressed general agreement with that view. For extended comments on the status of *G. spathulatum*, see Feldmann & Hamel (195: 115) and Ardré (33: 71–72 [203–204]).

Gelidium spinulosum (C. Agardh) J. Agardh
Canaries (2; 68; 191; 221; 227; 401; 431; 499).
Western Sahara (393; 394; 476).
'Nordwestafrika' (499).
'outre le Maroc aux Canaries' (221).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
[As *Gelidium spinulosum* J. Agardh]
Canaries (242).
'De Cadix aux Canaries' (89).

[As *Gelidium spinulosum* J. Agardh ex J. Agardh]
'In Oceano atlantico calidiore' (27).
[As *Gelidium corneum* (Hudson) Lamouroux var. *spinulosum* C. Agardh]
Canaries (318; 401).
'Ad oras Africae' (318).

Note. See the notes to *Gelidium microdon* Kützing for comments on conspecificity of these two and other species. Although Acuña Gonzalez (2) stated 'perteneciente al continente Africano', Papenfuss (431: 174) excluded the species from the South African marine flora.

Gelidium versicolor (S. Gmelin) Lamouroux
Angola (298; 352; 611).
Canaries (253; 306B; 582; 583).
'West African coast to the north of the Gulf of Guinea' (352).
[As *Gelidium cartilagineum* (L.) Gaillon]
Angola (298; 393; 394; 424; 425).

Note. For records of what was previously deemed the same taxon from the Canary Islands, see *Gelidium canariensis* (Grunow) Seoane-Camba. Although Simons in Day (523: 528) recorded the South African distribution as only 'Port Nolloth to Port Elizabeth', as usual in conditions of heavy surf on rock, the presence of strong populations in Angola and of the acknowledged records from Port Nolloth, near the Namibia/South Africa border, would certainly suggest that any rocky areas with surf along the Namibian shore-line could also bear populations. See also the general note to *Gelidium* and that to *Gelidium arbuscula* Bory ex Børgesen.

Gelidium spp.
Angola (298; 352).
Ascension (474).
Cameroun (337; 344; 393; 394; 533).
Canaries (2; 5; 8; 66; 71; 214; 237; 351; 393; 394; 486; 493; 583).
Cape Verde Islands (423).
Côte d'Ivoire (287; 290; 394).
Ghana (42A; 287; 290; 297; 299; 338; 340; 344; 376; 393; 394; 487; 567).
Guinée (344; 384; 393; 394; 529).
Liberia (287).
Mauritanie (349; 529).
Namibia (348; 522).
Nigeria (344; 393; 394).
Sénégal (121; 123; 344; 393; 394; 411; 529).
Sierra Leone (339; 344; 393; 394).
Western Sahara (349; 393; 394; 395; 476).
'Tropical west Africa' (611).
West Africa (290; 344).

Gigartina acicularis (Roth) Lamouroux
Bioko (346; 350; 586).
Cameroun (172; 243; 269; 337; 344; 350; 447; 537; 586).
Canaries (2; 38B; 38C; 38D; 128A; 172; 227; 253; 306B; 392; ?490; 584; 598; 604).
Gambia (350; 586).
Ghana (42A; 153; 269; 291; 335; 338; 340; 344; 350; 374; 537; 586).
Guinée (344; 350; 537; 586).
Liberia (350; 586).
Mauritanie (38B; 38C; 38D; 349; 500).
Salvage Islands (38B; 38C; 38D; 598).
São Tomé (93; 350; 586).
Sénégal (38B; 38C; 38D; 53; 55; 59; 344; 537).
Sierra Leone (350; 586).
Western Sahara (36B; 38C; 38D).
'[Associations on] , , , African west coast' (374).

'Atlántico (Inglaterra – Sudáfrica . . .)' (253).
'Atlantik Küste von Afrika (. . . Golf von Guinea)' (270).
'Atlantique (de l'Angleterre à la Mauritanie)' (33).
'British Isles to the Cameroons' (172).
'British Isles south to Cameroun' (243).
'from the British Isles . . . south to Cameroun' (447).
'Gran Bretaña a Camerun' (604).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara].' (598).
'Tropical Africa (N. Gambia – Congo river)' (598).
'Tropical West Africa' (611).
'widespread in warm temperate and tropical seas' (350; 586).
[As *Gigartina acicularis* (Wulfen) Lamouroux]
Angola (352).
Cameroun (173).
Canaries (13; 16; 70; 108; 189; 191; 375; 379; 439; 441; 444; 489; 499; 517).
Gambia (296).
Ghana (173).
Guinea-Bissau (?529).
Guinée (?529).
Liberia (129).
Mauritanie (349; 529).
Salvage Islands (215).
São Tomé (252).
Sénégal (529).
Sierra Leone (30; 295).
Western Sahara (349).
'Atlantico (de Inglaterra a Canarias)' (517).
'Atlantique: depuis les côtes anglaises jusqu'en Mauritanie' (222).
'Atlantique (de l'Angleterre aux Canaries . . . Sans doute répandu dans toutes les mers chaudes.' (189).
'Cosmopolite/subcosmopolite' (529).
'D'Angleterre aux Canaries' (89).
'de l'Irlande et de la Grande-Bretagne au Cameroun' (178).
'From the English coast southwards to the Canary Islands' (70).
'Golf von Guinea' (270).
'Nordwestafrika' (499).
'Seems to occur in all warmer seas.' (63).
[As *Fucus acicularis* Turner]
Ghana (271).
[As *Sphaerococcus acicularis* (Wulfen) C. Agardh]
'In mari Atlantico, ab oris Galliae septentrionalis ad Africam.' (588).

Note. Børgesen's (70) specimens were all small and sterile. The Hornemann (271) record from 'Danish Guinea' [present day Ghana] is attributed here on nomenclatural equivalence only, but there is no reason to doubt its presence in Ghana, since modern records are plentiful. The P. E. Isert collection examined by Hornemann needs examination for full confirmation, but the relevant material may have been destroyed at C [Copenhagen] during the 1807 fire that resulted in the loss of some Isert specimens. There may be a very early (1803) Canaries record concealed amongst the heterogeneity of material described under *Fucus perforatus* Bory (90: 305, pl. V, figs 1A, B, C); see the entries for *Carpococcus perforatus* (Bory) J. Agardh and *Laurencia perforata* Montagne.

Gigartina bracteata (S. Gmelin) Setchell & Gardner
Namibia (36B; 522A).

Note. See 36B: 314 for discussion by Wynne of various morphological, taxonomic, and nomenclatural aspects.

Gigartina burmannii (C. Agardh) J. Agardh
See *Gigartina stiriata* (Turner) J. Agardh.

Gigartina confervoides (L.) Lamouroux [or simply Lamouroux]
See *Gracilaria verrucosa* (Hudson) Papenfuss.

Gigartina cylindrica Despreaux
Note. See *Gracilaria dura* (C. Agardh) J. Agardh. The entry in Montagne (401: 160) for *Gigartina dura* Desmazières states under 'Hab.': '*Gigartina cylindrica* Despr. in schedulâ.'

Gigartina dura Desmazières
See *Gracilaria dura* (C. Agardh) J. Agardh.

Gigartina elegans Greville in St-Hilaire
See *Gigartina teedii* (Roth) Lamouroux.

Gigartina fastigiata J. Agardh
See *Gigartina scutellata* (Hering) Simons in Seagrief.

Gigartina flagelliformis (Sonder) Sonder
'Ad oras Africae occidentales: Lenormand!' (326).
Note. Neither the alga being referred to nor the location from which it came are clear, 'West Africa' being referred to. Sonder (1845: 55) originally described his taxon in *Polyides* and certainly the plant illustrated in Kützing's (326: pl. 5, no. 4030, figs c, d) 1868 presentation has much in common with *Polyides*/*Furcellaria*, rather than with *Gigartina*, where Sonder (1846) recombined it. The 1868 reference to the species is the first time that West Africa is referred to, all previous details concerning material being from 'Novam-Hollandiam'. Presumably Kützing received or saw Lenormand Herbarium material citing the African data. If Kützing's drawing is an accurate representation of the Lenormand material, then it has to be taken that the entry is generically mis-placed in *Gigartina*. In 1869, when Kützing again (pl. 18, figs c, d, no. 4248) employed the name *Gigartina flagelliformis* of Sonder, the plant illustrated appears closer to *Gracilaria* then to either *Gigartina* or *Polyides*/*Furcellaria*. Kützing then stated (p. 7) '*nec Kg. Tab. ph. XVIII. tab. 5.*' and cited only 'Novam Hollandiam', remarking that the structure was still nearer to *Polyides* or *Furcellaria*. J. Agardh (24: 283, no. 38) maintained the taxon in *Gigartina*, but commented that the internal structure was like *Polyides*/*Furcellaria* and cited only New Holland as location. De Toni (131: 227) commented 'Videtur forsan *Rhabdoniae* species'.

Gigartina griffithsiae (Turner) Lamouroux [or simply Lamouroux]
See *Gymnogongrus griffithsiae* (Turner) Martius.

Gigartina perforata (Bory) De Toni [or (Bory) J. Agardh]
See *Carpococcus perforatus* (Bory) J. Agardh.

Gigartina pistillata (S. Gmelin) Stackhouse
Canaries (70; 191; 227; 229; 306B; 375; 489; 490; 499; 517; 598).
Mauritanie (245B; 252; 349; 500; 529).
Sénégal (59; 394).
Western Sahara (349).
'Atlantico (de Inglaterra a Canarias)' (517).
'Atlantique (de l'Angleterre au Rio de Oro)' (33).
'Atlantique: depuis les côtes britanniques jusqu'au Rio de Oro' (222).
'Atlantischer Ozean, von der englischen Küste an südwärts bis zur nordwestafrikanischen.' (497).
'British Isles to South Africa' (172).
'depuis le sud de la Grande-Bretagne jusqu-au Sénégal (Bodard, com. verb.)' (173).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'From the English coast southwards to the Canary Islands.' (70).
[As *Gigartina pistillata* Stackhouse]
'de l'Angleterre aux Canaries' (89).
Note. The record by two of us (Lawson & John, 349) of this taxon from Western Sahara is based on Ardré

(33); we did not collect the alga there. Børgesen (70) based his comments solely on the report by Bornet (89: 273); there were no specimens in Herb. Thuret, nor did he find it.

Gigartina pygmaea Lamouroux
See *Chylocladia reflexa* Lenormand in Desmazières [*Gastroclonium reflexum* (Chauvin) Kützing].

Gigartina radula (Esper) J. Agardh
Namibia (161; 348; 437; 500; 522; 522A; 523).

Note. Unusually, with the exception of the purely secondary reports in Schmidt & Gerloff (500), all the above statements of record are at least partly based on original observation and collection. This taxon is also well known from South Africa (570) and from many parts of the Southern Ocean system.

Gigartina scabiosa (Kützing) Papenfuss
See *Gigartina scutellata* (Hering) Simons in Seagrief.

Gigartina scutellata (Hering) Simons in Seagrief
Namibia (522A).
[As *Gigartina scabiosa* (Kützing) Papenfuss]
Namibia (348; 522).

Note. Both the above recordings are based, at least in part, on original observations and collections. The species is also widely known in South Africa, whence it was first described; there are nomenclatural problems, the nature of which is clear from the entry on *G. scutellata* in Seagrief (570: 31). Clearly, Simons had decided that, despite contrasting opinions held elsewhere in regard to synonymy in at least parts of the application (and perhaps the concept) of the name *Chondrus scutellatus* Hering, it is in fact the same plant that is being referred to. If this is so, then the plant hitherto mostly known as *Gigartina scabiosa* (Kützing) Papenfuss has an earlier valid name that must be invoked. Hence, the recombination proposed by Simons of *Sphaerococcus (Chondrus) scutellatus* Hering (1841: 91) in *Gigartina*, resulting in the binomial used as heading to the present entry. The inclusion of these data in Seagrief's list (570: 31) was clearly based on information provided by Simons in a letter to Seagrief, doubtless with Simons's permission. He (the latter) presumably expected his paper on *Trematocarpus* (Sarcodiaceae) in southern Africa and the exclusion of *Chondrus scutellatus* Hering to have appeared before that of Seagrief. Despite the delay in publication of the Seagrief check-list (the correspondence with Simons was in 1982; Seagrief's paper did not appear until 1984) no further publication details of the Simons work were given, implying that it had not appeared by then. In view of both previous correspondence and proximity, it is likely that Seagrief would have had his attention drawn by Simons to its appearance. We have searched carefully for any sign of the publication but have been unable to trace it. Hence, the recombination is cited as above, details provided by Seagrief having been adequate to validate Simons's proposed changes. Seagrief's suggested synonymy of *G. scutellata* included *Gigartina fastigiata* J. Agardh [non Postels et Ruprecht].

Gigartina stellata (Stackhouse in Withering) Batters
See *Mastocarpus stellatus* (Stackhouse in Withering) Guiry in Guiry, West, Kim & Masuda.

Gigartina stiriata (Turner) J. Agardh
Namibia (348; 437; 522; 522A; 523).

Note. A further, previously separate, taxon in *Gigartina*. *G. burmannii* (C. Agardh) J. Agardh, has been shown to be the tetrasporophyte of *G. stiriata*.

Gigartina teedii (Roth) Lamouroux
Angola (500).
Cape Verde Islands (589; 598).
Guinea-Bissau (529).
Mauritanie (?344; 349; ?529).
Namibia (36B; 161; 522A).
Sénégal (47; 50; 52; 55; 59; 399; 529; 531).
Western Sahara (349).
'British Isles to Angola . . . Cape Verde Islands' (172).
'Nordwestafrika' (499).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Westafrika' (499).

[As *Gigartina teedii* Lamouroux]
Cape Verde Islands (38).
Sénégal (38; 122; 408).
[As *Gigartina teedii* Roth]
Cape Verde Islands (259).
[As *Gigartina teedii* J. Agardh]
Angola (41; 42).

Note. There seems no real evidence for the presence of this species in the Canary Islands; Dangeard (117; 118) specifically stated that it was missing from there. A certain number of expressed uncertainties have been ignored here – Bodard (47), for instance, recorded what may well have been the taxon as '*Gigartina* aff. *teedii*', and Dangeard (122), more verbosely, commented for Sénégal 'un *Gigartina* à ramification assez régulierement pennée, à branches et rameaux aplatis, qui se présente, soit à l'état stérile, soit porteur de nombreux cystocarpes . . . rapelle beaucoup le *G. teedii*'. Askenasy's record was rationalised from probabilities, not fully recorded; he (38) stated, 'n'ont pas été rapportées des îles du Cap Vert; il est très probable qu'elles y croissent aussi et qu'on les trouvera plus tard'. Ardré (33: 130–131) stated the southern limit of the *G. teedii* distribution range to be Morocco. On the subject of the relationships between *G. teedii* and *Gigartina elegans* Greville in St.-Hilaire, see Cordeiro-Marino (108: 77–78). For general background, see Guiry (589).

Gigartina spp.
Cameroun (393; 394).
Ghana (344; 393; 394).
Guinée (393; 394).
Mauritanie (393; 394).
Namibia (348; 438; 522; 611).
Nigeria (393; 394).
Sénégal (393; 394).
Sierra Leone (393; 394).

Note. The records from Namibia could well include any (or a mixture) of *Gigartina radula*, *G. scutellata*, or *G. stiriata* (q.v.) in addition to other unidentified forms.

Ginnania furcellata Montagne

Note. See *Scinaia forcellata* Bivona-Bernardi. The genus *Ginnania* is based on material from the Canaries, published by Montagne (401: 162), repeated elsewhere by the same author (402) and subsequently by others (e.g. Kützing, 318). Montagne later (408) cited the species with the addition '(Turn. sub *Ulva*).' According to Papenfuss (434: 281), the report of *Ginnania furcellata* from the Cape of Good Hope (Harvey, 354: pl. 69) related to *Pseudogloiophloea* (now *Scinaia*) *capensis*. This agrees with the absence of records more southerly than the Congo for any species of *Scinaia* in this area, *S. capensis* never having been reported. It is possible that the latter occurs in Namibia, and perhaps Angola.

Gloiophloea verae Dickinson
See *Scinaia verae* (Dickinson) Huisman.

Goniolithon

Afonso-Carrillo et al. (582: 25) accepted the characterization of this genus in the original (Foslie, 1898a) sense, as proposed by Cabioch (1972). All statements emanating from Afonso-Carrillo and/or colleagues must therefore be viewed in that light. The status of the genus *Goniolithon* Foslie has been explained by Johansen (1981: 218); Foslie's original concept of 1898 was later rejected by its author (1900*d*). The later changed concept was very different from the first version, and Setchell & Mason (1942) suggested that the second concept should be segregated as the new genus *Neogoniolithon* (type *N. fosliei*). *Goniolithon*, the first concept, remains (type *G. papillosum*). For a fuller explanation, see Woelkerling (1988). There is little or no authentic recording remaining for the list area under *Goniolithon*.

Goniolithon accretum Foslie & Howe
See *Neogoniolithon accretum* (Foslie & Howe) Setchell & Mason.

Goniolithon boergesenii Foslie
See *Hydrolithon boergesenii* (Foslie) Foslie.

Goniolithon brassica-florida (Harvey) Foslie

Note. Often referred to *Neogoniolithon*, as *N. brassica-florida* (Harvey) Setchell & Mason. See the note to *Neogoniolithon mamillare* (Harvey) Setchell & Mason.

Goniolithon byssoides (Lamarck) Foslie [or simply Foslie]
See *Titanoderma byssoides* (Lamarck) Chamberlain & Woelkerling.

Goniolithon mamillare (Harvey) Foslie
See *Neogoniolithon mamillare* (Hauck) Setchell & Mason.

Goniolithon mamillosum (Hauck) Foslie [and formae]
See *Neogoniolithon mamillosum* (Hauck) Setchell & Mason and notes to *Neogoniolithon mamillare* (Hauck) Setchell & Mason.

Goniolithon orotavicum Foslie
See *Neogoniolithon orotavicum* (Foslie) Lemoine.

Goniolithon papillosum (Zanardini ex Hauck) Foslie
See *Titanoderma papillosum* (Zanardini ex Hauck) J. Price, D. John & G. Lawson.

Goniolithon polycephalum (Foslie) Afonso-Carrillo
See *Titanoderma polycephalum* (Foslie) Woelkerling, Chamberlain & Silva.

Goniolithon subtenellum Foslie
See *Lithophyllum subtenellum* (Foslie) Foslie.

Goniolithon sp.
Canaries (212).

Note. Recorded by Foslie & Printz (212: pl. XLIII) as almost entirely covering *Archaeolithothamnion africanum* Foslie [*Sporolithon africanum* (Foslie) Afonso-Carrillo] 'by *Goniolithon* or *Lithophyllum* sp.'. In practical terms, the alga referred to could well have been of *Neogoniolithon* spp. (q.v.). We are currently unable to assign the plants to one or other genus/species.

Gottoniella fusiformis Børgesen
See *Cottoniella fusiformis* Børgesen.

Gracilaria and **Polycavernosa**

Gracilaria Greville is a very large, widely distributed, and complex genus, with more than 100 species of recent citation. Taxonomically difficult, the genus has been subject over the years to the occasional vogue of new species recognition and description, largely on the grounds of occurrence in different geographical areas. The literature therefore abounds with specific epithets, many of which will probably in due course prove to be quite superfluous. This general situation has been worsened by partial revisions of which many have appeared more obscuratory than elucidatory. Nevertheless, many valuable and detailed studies have been undertaken in recent years, and are still in progress, on various aspects of generic or specific taxonomic practice. See, for example, Bird & McLachlan, 1982*a*, 45, 46, 1984; Edelstein et al., 1978; Yamamoto, 1978; McLachlan & Bird, 318A; Oliveira, 1984; Oliveira filho & Plastino, 1982, 1984; Oliveira, McLachlan & Bird, 1982; Oliveira, 1983; Oliveira, Bird & McLachlan, 1983; Abbott & Norris, 1985; Bird, van der Meer & McLachlan, 1982; Gargiulo, De Masi & Tripodi, 1985; Bird & Oliveira, 592; and many others. A useful bibliography is presented in McLachlan & Bird, 593. The extent of current work reflects both widespread and abundant occurrence of the genus and its importance as a source of phycocolloid. Because of the existence of such detailed studies, rationalization here of records is only undertaken to the extent dictated by elimination of clear nomenclatural anomaly or by application of synonymy unequivocally established by the recent studies. Further development of work currently in progress may result in considerable change in both the basic criteria employed and the names to be applied as a consequence. Bird & McLachlan (1984: 41) have cogently summarised problems in this genus in stating: 'Although *Gracilaria* Greville is a reasonably well-defined genus of the Gigartinales, the taxonomy of its species is notoriously chaotic. It is becoming increasingly apparent that certain minor but fundamental differences among morphologically similar taxa merit consideration if species are

to be correctly defined. . . . it is equally important to sample widely for such features, to determine their uniformity throughout populations and under a variety of environmental conditions'. More recently, McLachlan & Bird (593: 27–28) have suggested that: 'We can expect little meaningful progress, either in understanding the genus or being able to exploit its species, until there has been a proper resolution of many taxonomic problems . . . for most of the species of commerce it is difficult to assign a specific name with any assurance'. This applies equally to non-commercial species.

Sources of much useful information on the generic group including *Gracilaria* and the segregate *Polycavernosa* are the Sections IV and V (pp. 67–162) of Abbott & Norris (1985). We have generally followed the ideas expressed there and have made use of appropriate comments from the text. On the current opinions concerning acceptability of *Polycavernosa* as distinct from *Gracilaria*, see the generic notes to the entry for *Polycavernosa*. Because of the close, complex and not unanimously-accepted nature of the relationships between *Gracilaria* and *Polycavernosa*, the latter has been included here, with all its relevant potential species, although out of its alphabetical order. Cross-references will be given as appropriate later, in alphabetical position.

Gracilaria angustissima (Harvey) Bodard
Sénégal (51; 52).
[As *Gracilaria angustissima*]
Sénégal (50).

Note. The relationships of the material on which these records are based and that often referred to as *Gracilaria foliifera* var. *angustissima* (Harvey) W. Taylor are not clear. Bodard (52) presented the combination used as species entry heading here as the main head for *his* species entry, qualifying it as 'nom. prov.'. He included in his synonymy both *Gracilaria foliifera* var. *angustissima* (Harvey) W. Taylor [1937] and *Gracilaria multipartita* var. *angustissima* J. Agardh [1876]. Since Bodard had no fertile specimens available, he took for reference F. S. Collins no. 610, a cystocarpic *Gracilaria* close in form to Bodard's other material and clearly neither of the taxa with which the latter was contrasting '*G. angustissima*'; these taxa were known by him as *Gracilariopsis tridactylites* and *G. disputabilis*. Although he deduced that '*G. angustissima*' was much closer to *G. dentata* than to the other species treated, Bodard's last sentence stated: 'Cette espèce est encore mal connue, c'est pourquoi nous maintenons provisoirement ce nom.'

Other complications exist, in that Bodard both previously (51) and subsequently (Bodard & Mollion, 59) had in places referred to what must (presumably) be the same entity as that here concerned as *G. dentata* var. *angustissima* (51) and '*Gracilaria dentata* P. Dang. var. *angustissima* Bodard comb. nov.' (59: Table I – Gorée). Since the latter paper is the latest (1974), it could be considered that this statement represents Bodard's final view of the matter, in which case acceptance as a valid taxon would require transfer to *Polycavernosa dentata* (q.v.). Since re-examination of original specimens is required to establish both firm relationship to *Gracilaria dentata* sensu stricto and validity of any transfer to *Polycavernosa*, we have retained the present arrangement pending further work.

A little earlier than any of the works cited above, Bodard (50: 83–84, 1966) had passingly referred to a record for Pointe de Sarène (Sénégal) under *Gelidiopsis variabilis*: 'A première vue, on pourrait confondre cette espèce avec des *Gracilaria augustissima*'. We have taken the view that this is orthographic or typographic error for *Gracilaria angustissima*; the record therefore appears here.

Gracilaria armata (C. Agardh) J. Agardh
Canaries (70; 128A; 184; 191; 227; 252; 375; 392; 547; 598; 610).
Mauritanie (184; 252; 349).
Western Sahara (349).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
[As *Gracilaria armata* J. Agardh]
Canaries (547).

Note. See also the notes to *Gracilaria dura* (C. Agardh) J. Agardh. For recent comments on the taxon *G. armata* in the NE. Atlantic/Mediterranean area, see Gargiulo, De Masi & Tripodi (1985).

Gracilaria augustissima sine auct.
See *Gracilaria angustissima* (Harvey) Bodard.

Gracilaria bursa-pastoris (S. Gmelin) Silva

Cape Verde Islands (598).
Mauritanie (349).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'British Isles to Sénégal . . . Cape Verde Islands' (172).
[As *Gracilaria compressa* (C. Agardh) Greville]
Cape Verde Islands (252; 448; 449).
Mauritanie (252).
São Tomé (25).
Sénégal (529).
'wärmeren atlantischen Ocean' (506).
[As *Gracillaria compressa* Greville]
Cape Verde Islands (38).
[As *Gracilaria compressa* C. Agardh]
'Warmer Atlantic' (410).

Note. J. Agardh (25: 594) recorded *G. compressa* as 'ad insul. S:t Thomas (Hb. Binder!)'. Piccone (449) indicated that the systematic position of his material from Cape Verde Islands was uncertain. The mention of this species from Mauritanie by two of us (see Lawson & John, 349) was secondary and based on that for *G. compressa* in Hariot (252). For recent comments on aspects of this taxon in the NE. Atlantic/ Mediterranean area, see Gargiulo, De Masi & Tripodi (1985).

Gracilaria camerunensis Pilger
Cameroun (139; 350; 454; 500; 586).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
Sénégal (59; 394; 399; 611).
'Tropical Africa (N. Gambia – Congo river)' (598).
'in warm temperate and tropical parts of the eastern Atlantic Ocean' (350; 586).
'l'aire se limite au golfe du Bénin et à la Mauritanie' (59).
'plus au sud dans le golfe du Benin' (59).
[As *Gracilariopsis camerunensis* (Pilger) Bodard]
Cameroun (51).
Sénégal (51; 52).
'sûrement présente dans tout le Golfe du Bénin' (52).

Note. De Toni (139: 250–251) based his entry directly on Pilger's (454) treatment of the Ledermann collection from 'Bodje', Cameroun. Bodard (52) indicated the taxon to be very near to *Gracilariopsis sjoestedtii* [= *Gracilaria lemaneiformis* (Bory) Weber-van Bosse], although he did not see the type of Pilger's *Gracilaria camerunensis*.

Gracilaria cervicornis (Turner) J. Agardh
?Bioko (346; 586).
Cameroun (586).
Ghana (586).
'in warm temperate and tropical seas' (586).
'Tropical Africa (N. of Gambia – Congo river)' (598).
[As *Gracilaria ferox* J. Agardh]
?Bioko (350).
Cameroun (269; 337; 350; 537).
Ghana (108; 350; 418; 419).
'in warm temperate and tropical seas.' (350).
[As *Gracilaria* sp.]
Cameroun (337).

Note. Oliveira filho, McLachlan & Bird (1982) and Oliveira filho, Bird & McLachlan (1983) have indicated that *G. cervicornis* (Turner) J. Agardh and *G. ferox* J. Agardh represent a morphological complex with entities distinguishable at extremes but with overlapping gradations even within populations. Apart from the vegetative appearance, similarities include structure of the tetrasporangia, spermatangia, cystocarps, and internal anatomy, and poor gelling of agar extracts. Hence, Oliveira f. et al. have reduced the complex to the single species *G. cervicornis*, *G. ferox* being reduced to synonymy.

Morphologically, *Gracilaria domingensis* Sonder ex Kützing [in syn.] shares certain similarities with *G. cervicornis*, but the two taxa are said to be separable as distinct species since *G. domingensis* has its spermatangia in deep crypts [cf. shallow conceptacles], with its cortex being thin and of subquadrate cells [cf. multilayered cortex of radially elongated cells]. This has led us to decide that *G. domingensis* should be recombined in *Polycavernosa* (q.v., also *P. dentata* J. Agardh).

There has not been total agreement on the conspecificity of *G. cervicornis* and *G. ferox*. Cordeiro-Marino (108: 61) had expressed an opinion that these taxa were both different from each other and from *G. domingensis*, by virtue of the *ferox* subcylindrical principal axis and its branching in more than one plane. *G. ferox* was described from Pernambuco (Brasil). Cordeiro-Marino's (108) Ghana record was derived directly from Ohmi (419). Similarly, Hoppe's (269) Cameroun report was based on Lawson (337).

Recent comments on *G. cervicornis* in the north-east Atlantic and Mediterranean are presented in Gargiulo, De Masi & Tripodi (1985).

See also the notes at *Gracilaria multipartita* (Clemente) Harvey.

Gracilaria compressa (C. Agardh) Greville [or Greville]
See *Gracilaria bursa-pastoris* (S. Gmelin) Silva.

Gracilaria confervoides (L.) Greville
See *Gracilaria verrucosa* (Hudson) Papenfuss.

Gracilaria corallicola Zanardini
See *Gracilaria multipartita* (Clemente) Harvey and *Gracilaria lacinulata* (Vahl) Howe.

Note. This taxon is not the *Rhodymenia corallicola* of Ardissone (q.v.). For recent comments on the taxon in the north-east Atlantic and Mediterranean areas, see Gargiulo, De Masi & Tripodi (1985).

Gracilaria corticata J. Agardh
[As *Fucus aeruginosus* Turner]
Ghana (271; pro parte)

Note. For the background to the inclusion here of this taxon, see the notes to *Gracilaria multipartita* (Clemente) Harvey [= *Gracilaria foliifera* (Forsskål) Børgesen]; these notes also present explanation of the use above of 'pro parte'. The situation may require revision in the light of any established or deduced identity of the P. E. Isert Ghana collections, on which the above published information was based. Unfortunately, the Isert material was probably destroyed in a fire in København (1807). What is really represented by the taxon *G. corticata* J. Agardh is not clear; from available information, it seems highly likely to be little more than a form of *G. multipartita*, although that equally difficult concept *Gracilaria [Polycavernosa] dentata* could also have been involved. Many authors have expressed reservations as to significance and/or name application in some or all of these taxa. Jaasund (1977*b*: 420) outlined the confusion in application of the names *G. corticata* and *G. multipartita*/*G. foliifera*, at least in Indian Ocean material. Askenasy (38: 168), commenting under his *G. dentata* J. Agardh heading, indicated: 'Je possède un exemplaire de cette algue provenante de l'herbier Lenormand et étiqueté: *Gracilaria corticata* J. Ag. Ins. Sal. Cap de Verde, Forbes I.' See also the notes to *Polycavernosa (Gracilaria) henriquesiana* (Hariot) Chang & Xia.

Gracilaria damaecornis J. Agardh
Sénégal (51; 52).
[As *Gracilaria* type D]
Sénégal (529).

Note. Bodard's (52: 36) entry is wholly based on Sourie's plants collected from Cap de Naze. Specimens are apparently quite rare. Bodard's (*loc. cit.*) final sentence reads 'C'est le *Gracilaria* type D de Sourie'. The latter has also been entered at *Gracilaria* spp. for completeness.

Gracilaria debilis (Forsskål) Børgesen
See the notes to *Polycavernosa debilis* (Forsskål) Fredericq & Norris and *Polycavernosa (Gracilaria) henriquesiana* Hariot.

Gracilaria dendroides Gargiulo, De Masi & Tripodi
See the note to *Gracilaria verrucosa* (Hudson) Papenfuss.

Gracilaria dentata J. Agardh

Note. See also *Polycavernosa dentata* (J. Agardh) G. Lawson & D. John and *P. henriquesiana* (Hariot) Chang & Xia. Xia & Abbott (571: 161, footnote 1) have indicated that: 'If *Gracilaria dentata* J. Agardh as

interpreted by Lawson and John (350) proves to be the same species as *P. henriquesiana*, its transfer to *Polycavernosa* should be made and that binomial used as it will be the earlier name'. This course of action has been carried out by Lawson & John (586), but according to Abbott later (in litt. to DMJ, 11/6/1986) the isotypes of (and customs of application of names of) *G. dentata* and *G. henriquesiana* do not represent the same entity.

It seems likely that workers generally on West African material will not entirely agree with Abbott as to the customs of name application there, more especially as a rather small proportion of the material determined usually emerges as male and as vegetative characteristics of specimens so overlap that intuitive evaluation is often the principal basis for naming. Ghanaian populations, especially, show clinal morphological variation resulting from collecting season; the correlation of low tidal periods in the day with season; growth on abrupt scarp or gentle dip slopes relative to aspect and wave-impact; microniche (e.g., pools; crevices) within major habitat; extent and form of perennation.

Similarly, there may be little typificatory basis for the so-definite statement of difference by Abbott (in litt.). Steentoft (pers. comm., March 1987), examining the type material of *Gracilaria henriquesiana* Hariot (Ribeiro 14; Coimbra [COI]), found both male and female plants present; the males possessed spermatangia developed within deep, variably- but often multi-locate crypts in the thallus, so that the species has to be referred to *Polycavernosa* rather than *Gracilaria* if the generic division is accepted. If Ohmi's (419) study of the Ghanaian material available to him is representative of the whole West African range, attribution by name application confirms placement in *Polycavernosa*.

Since *G. dentata* has already been recombined in *Polycavernosa* (586), it therefore appears there as records in this listing; earlier establishable misdeterminations as *G. henriquesiana (Polycavernosa henriquesiana)* also appear under *Polycavernosa dentata*, with the exception of São Tomé material, for which evidence is thus far lacking as regards spermatangial form. São Tomé elements therefore remain as *Polycavernosa (Gracilaria) henriquesiana*, pending clarification.

Gracilaria dichotomo-flabellata P. Crouan & H. Crouan in Schramm & Mazé

Note. See the entries for *Gracilaria feldmannii* Bodard and *Gracilaria mammillaris* (Montagne) Howe. Schneider (1975: 643, 645) has shown that the above authority citation is a nom. nud., the correct publishing authorities form being 'P. & H. Crouan ex Collins & Hervey'.

Gracilaria disputabilis (Bodard) Bodard
Côte d'Ivoire (288; 350; 586).
Ghana (288; 350; 586).
Sénégal (51; 350; 586).
Sénégal (Casamance) (51; 350; 586).
'in warm temperate and tropical parts of the eastern Atlantic Ocean' (350; 586).
'Tropical Africa (N. Gambia – Congo river)' (598).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
[As *Gracilariopsis* (?) *disputabilis* Bodard]
Sénégal (Casamance) (51; 52)
[As *Gracilariopsis* (?) *tridactylites* Cr. (= J. Ag.?) M. Bodard, comb. nov.]
Sénégal (Casamance) (52).
's'étend audelà de la Casamance [Sénégal] jusqu'en Côte d'Ivoire (récolte Sourie).' (52).
[As *Gracilaria tridactylites* Bodard]
Sénégal (51).

Note. The type of confusion that applies in at least certain taxa in this and adjacent genera is clear from the comment made by two of us (Lawson & John, 350; 586) that *Polycavernosa [Gracilaria] dentata* occurs in much the same situations as the present species 'but the two species are impossible to separate on the shore.' In such circumstances, it is not surprising that misapplication of names has been a consistent aspect of all but the most critical taxonomic work conducted in the most well-endowed institutions. In speaking of his *Gracilariopsis* (?) *[Gracilaria] tridactylites*, Bodard (52: 39) stated it to be 'une espèce qui est souvent confondue avec *Gracilaria foliifera* (sensu lato) et particulièrement avec l'ancien *Gracilaria lacinulata*.' He later (51: 869) commented that 'La modification de la précédente étude [= 52] tient essentiellement dans la suppression d'une espèce. Les noms provisoires de *Gracilariopsis tridactylites* et *Gracilariopsis* (?) *disputabilis* donnés pour deux espèces ne correspondent qu'à une seule espèce dont le développement du cystocarpe mérite une attention toute particulière.' Subsequently (in litt. to DMJ, 18/2/1971), Bodard had carried simplification in use of at least the quantity of names further still, in stating 'Il faut rassembler

Gracilariopsis tridactylites et *Gracilariopsis disputabilis* dans la même espèce *Gracilariopsis henriquesiana*.' This latter view has never been generally accepted, even taking account of the deep confusions attaching to taxon limits, and has not been further employed here.

Gracilaria domingensis Sonder ex Kützing [in synonymy]

Note. We have concluded that this taxon should be recombined in the genus *Polycavernosa*, if the latter is accepted. See details in the note to *Gracilaria cervicornis* (Turner) J. Agardh and the recombination entry for *Polycavernosa domingensis* (Kützing) J. Price & D. John.

Gracilaria dura (C. Agardh) J. Agardh
Canaries (70; 89; 191; 226; 390; 598).
'Atlantic Ocean (warmer regions)' (177).
[As *Gigartina dura* Desmazières]
Canaries (44; 401).
'warmer parts of the Atlantic Ocean . . . seems to be widespread.' (70).
[As *Gracilaria dura* (C. Agardh) J. Agardh var. *β Lyra* J. Agardh]
Canaries (439).

Note. According to De Toni (132: 433–434), the *Gigartina dura* Desmazières record presented in Montagne (401: 160) is actually referable to *Gracilaria armata* (C. Agardh) J. Agardh (q.v.). Another name involved seems to have been *Gigartina cylindrica* Despreaux; see the note at the latter. Piccone's (439) record of var. *β Lyra* was named because of the secondary branching present. Børgesen (70) did not find the species, but mentioned it because Bornet (89: 283) indicated it was a Canarian species 'referring most probably to a specimen in Montagne's Herb.' For recent comments on the taxon in the north-east Atlantic and Mediterranean see Gargiulo, De Masi & Tripodi (1985). For an additional record probably to be referred here, see the entry for *Gracilaria rubra* (C. Agardh) J. Agardh.

Gracilaria feldmannii Bodard ['(nom. prov.)']

Note. Although Bodard (52: 44) named this taxon as 'nom. prov.', he did present a Latin diagnosis, stating also that on first collection it was taken as a *Rhodymenia*. Subsequently (51: 881 and 885), Bodard decided that the species was really one already known as '*Gracilaria dichotomoflabellata* (Crouan MS) Mazé et Schramm', a mis-statement of authority form (see the latter entry). *G. dichotomoflabellata* was itself included in *Gracilaria mammillaris* (Montagne) Howe (q.v.), a fact confirmed by Bodard (in litt., 18/2/1971): 'Quant au *Gracilaria Feldmannii*, c'est tout simplement *Gracilaria mammillaris* d'Amérique.'

Gracilaria ferox J. Agardh
See *Gracilaria cervicornis* (Turner) J. Agardh.

Gracilaria foliifera (Forsskål) Børgesen
See *Gracilaria multipartita* (Clemente) Harvey.

Gracilaria henriquesiana Hariot
See *Gracilaria dentata* J. Agardh, *Polycavernosa dentata* (J. Agardh) G. Lawson & D. John, and *Polycavernosa henriquesiana* (Hariot) Chang & Xia.

Gracilaria lacinulata (Vahl) Howe

Note. See the entry for *Gracilaria multipartita* (Clemente) Harvey. Hauck (1885) indicated that the present species was possibly a form of *Gracilaria foliifera* [= *G. multipartita* for the eastern Atlantic], a likelihood borne out by Børgesen's (70) and Howe's (1920) examination of Canary Islands material, previously identified by Piccone (439) as *Gracilaria corallicola* Zanardini, and of Vahl's *Fucus lacinulatus* specimens.

See also the notes to *Gracilaria disputabilis* (Bodard) Bodard.

Gracilaria lemaneiformis (Bory) Weber-van Bosse
Sénégal (592).
[As *Gracilariopsis sjöstedtii* (Kylin) Dawson]
Sénégal (51; 52; 59; 182).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'sûrement présente dans tout le Golfe du Bénin' (52).
[As *Gracilariopsis sjoestedtii* Dawson]
Sénégal (55).

[As *Gracilariopsis sjoestedtii* Kylin]
Sénégal (399).

Note. Renderings of the specific epithet as '*sjöstedtii*' and '*sjoestedtii*' are treated as equivalents here. Bodard (52: 32–34) stated that this was by far the most frequent *Gracilaria*/*Gracilariopsis* species in Sénégal, and was often referred to as *Gracilaria confervoides*, in error. Such reference is not surprising; Hoyle (1984: 48, 50), basing his comments on Abbott (1983), indicated that currently there are available no reliable vegetative characteristics 'by which what is called *G. [racilaria] verrucosa* (Hudson) Papenfuss by Abbott & Hollenberg (1976) can be distinguished from *G. sjostedtii* Kylin'. Abbott, the editor of the work in which Hoyle (1984) published, added in parenthesis that although both Hoyle and she realised that *verrucosa* as an epithet was incorrectly applied to the Californian entity, they had not at that stage enough evidence to apply another name.

Since that time, the name *Gracilaria lemaneiformis* ['*lemanaeiformis*'] has often been utilised for the western Atlantic specimens and, indeed, Dawson, Acleto & Foldvik (1964: 59–60) had earlier already recombined that epithet in Dawson's *Gracilariopsis*. Recently (1986), Bird & Oliveira (592: 319–320), in describing their new species *Gracilaria tenuifrons* and providing details of the distinctions between it and the seemingly close *G. lemaneiformis*, commented:

> 'We have previously questioned the wide distribution of some species of *Gracilaria*. . . . and now suggest that reports of *G. sjoestedtii*/*G. lemaneiformis* outside the Pacific Ocean may be erroneous. It would, however, be equally incorrect to equate all western Atlantic records of *G. sjoestedtii* with *G. tenuifrons*. . . . It is appropriate here to urge strongly that identification of *G. lemaneiformis* and related species be authenticated by the presence of reproductive structures and especially [*Gracilariella*] *chorda*-type spermatangia.'

See also the notes to the entry for *Gracilaria verrucosa* (Hudson) Papenfuss.

Gracilaria mammillaris (Montagne) Howe
Sénégal (51; 55; 59).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
[As *Gracilaria mamillaria*]
Sénégal (59).
[As *Gracilaria feldmannii* Bodard '(nom. prov.)']
Sénégal (51; 52).

Note. See Schneider (1975: 643, 645) on the rendering of the epithet with the doubled radical consonant; we, too, have followed Montagne's basionym usage, despite the existence of the alternative (single 'm') form. For further data on attribution of records here, see the note to the entry for *Gracilaria feldmannii* Bodard.

Gracilaria multipartita (Clemente) Harvey
Canaries (70).
Cape Verde Islands (145; 252).
Ghana (586).
Mauritanie (252).
Sénégal (529, pro parte).
'British Isles south to Sénégal' (243A).
'probably widespread in warm temperate and tropical seas.' (586).
[As *Gracilaria multipartita* Harvey]
Cape Verde Islands (38).
[As *Gracilaria multipartita* Clemente]
Cape Verde Islands (145).
[As *Gracilaria multipartita* Agardh]
Canaries (117; 118).
[As *Rhodymenia multipartita* (Clemente) Montagne, or simply Montagne]
Cape Verde Islands (38; 408).
[As *Gracilaria foliifera* (Forsskål) Børgesen]
Canaries (191; 226; 227; 267A; 517; 598).
Cape Verde Islands (408; 598).
Ghana (290; 299; 350; 376; 377; 611).

Mauritanie (52; 267A; 344; 349; 393; 394; 529; 537).
Sénégal (48; 51; 52; 55; 56; 59; 267A; 399; 529, pro parte; 542).
Western Sahara (349).
'Atlantique (de l'Angleterre au Maroc, Canaries . . .)' (33).
'British Isles to Sénégal' (172).
'connue de tout l'Atlantique tropical' (52).
'Liberian-Cameroon Coast' (381A).
'Pantropical' (529).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'probably widespread in warm temperate and tropical seas.' (350).
'Tropical Africa (N. Gambia – Congo river)' (598).
'warmer parts of Atlantic' (81).
'wärmere Teile des Atlantik' (224).
[As *Gracilaria corallicola* Zanardini]
Canaries (439).
[As *Gracilaria lacinulata* (Vahl) Howe]
Canaries (70).
[As *Fucus aeruginosus* Turner]
Ghana (271, pro parte)

Note. Guiry & Freamhainn (243A) have presented reasoning as to why *Gracilaria foliifera* should now be recognized under the name *G. multipartita* (Clemente) Harvey for material from the eastern Atlantic. This is a resuscitation of a name much used previously, as a result of the separation of materials from the western Atlantic (*G. tikvahiae*), eastern Atlantic (*G. multipartita*) and Red Sea/Arabian Sea/Indian Ocean (*G. foliifera*). For other recent comments on the taxon in north-east Atlantic/Mediterranean areas, see Gargiulo, De Masi & Tripodi (1985). See Lawson & John (350; 586) and Bodard (52) for comments on the reallocation here, or to a new species, of African (e.g., Sénégalese) and Canaries plants hitherto called *Gracilaria [Polycavernosa] dentata*. See also the latter entry.

The *G. foliifera/multipartita* records in Sourie (529) are stated by the author to be equivocal – 'Sa présence à Daker est très douteuse' – hence the use of 'pro parte'. Sourie (529: 116) noted that Feldmann, who examined the plants, considered them possibly to represent *Gracilaria [Polycavernosa] dentata*, possibly *Gracilaria foliifera*.

For the possible relationships between the taxa and name applications in *G. multipartita* and *G. corticata* J. Agardh, see the notes at the entry for the latter.

The occasional statement in the literature that *Gracilaria domingensis* Sonder ex Kützing is a morphological variant of *Gracilaria multipartita* var. *polycarpa* (Greville) J. Agardh and the name *G. domingensis* therefore a synonym of *G. foliifera [G. multipartita]* is a misconception. See Oliveira filho, Bird & McLachlan (1983). *G. domingensis* is similarly not synonymous with *G. cervicornis*; see the notes to the latter.

According to De Toni (132: 447–448), the *Fucus aeruginosus* of Dawson Turner (*Hist. Fuc.*, t.147), referred to in Hornemann (271) for Ghana, is to be attributed in part to *Gracilaria multipartita* (Clemente) Harvey and in part to *Gracilaria corticata* J. Agardh (q.v.). With this kind of nomenclatural equivalence and in the absence of examination of the P. E. Isert Ghana specimens, which may or may not have been destroyed in the 1807 fire in København (see 350; 586), it is possible that the original material represented any or a mixture of *G. multipartita*, *G. corticata*, and *G. [Polycavernosa] dentata*. See the fuller note at *G. corticata*.

Gracilaria occidentalis (Børgesen) Bodard
Sénégal (48; 51; 52; 59; 182).
'doit se trouver çà et là dans l'Atlantique tropical' (59).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).

Note. Recombined in *Gracilaria* by Bodard (48) because of the nature and structure of the cystocarps. Described in *Rhodymenia* by Børgesen.

Gracilaria poitei (Lamouroux) C. Agardh
See *Laurencia poitei* (Lamouroux) Howe and notes to the entry for *Polycavernosa henriquesiana* (Hariot) Chang & Xia.

Gracilaria rubra (C. Agardh) J. Agardh
Canaries (227).

Note. Gracilaria rubra is a recently-described Chinese species for which the correct authorities are Chang & Xia. This is the only traced citation of the binomial with the present authorities for either the list area or any other geographical region. Even Gil-Rodríguez and Afonso-Carrillo do not refer to it elsewhere. The alphabetical order of entries around it in (227) shows that *G. rubra* is out of sequence and probably represents an orthographic error for '*dura*', the authorities for which are '(C. Agardh) J. Agardh'.

Gracilaria sjöstedtii Kylin
See *Gracilaria lemaneiformis* (Bory) Weber-van Bosse.

Gracilaria tenuifrons Bird & Oliveira f.
See *Gracilaria lemaneiformis* (Bory) Weber-van Bosse.

Gracilaria tridactylites Bodard
See *Gracilaria disputabilis* (Bodard) Bodard.

Gracilaria verrucosa (Hudson) Papenfuss
Angola (352; 535).
Cameroun (288; 350; 535; 586).
Canaries (38D; 128A; 227; 392; 584; 598).
Congo (535).
Côte d'Ivoire (287; 288; 350; 586).
Ghana (288; 299; 350; 376; 418; 419; 535; 586).
Liberia (129; 350; 586).
Mauritanie (38D; 349; 535).
Namibia (36B; 274; 348; 393; 394; 522; 522A; 612).
São Tomé (288; 350; 535; 586).
Sénégal (38D; 535).
Sénégal (Casamance) (350; 586).
Sierra Leone (295; 350; 586).
Togo (287; 288; 350; 586).
Western Sahara (38D; 349).
'Atlantique (de la Scandinavie au Rio de Oro)' (33).
'Atlantique: depuis la Scandinavie jusqu'au Rio de Oro' (222).
'Luderitz [S.W.A.] to Port Elizabeth [S.A.]' (523).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Tropical Africa (N. Gambia – Congo river)' (598).
'West Africa' (345).
'widely distributed . . . in the Gulf of Guinea' (535).
'widespread from boreal-antiboreal to tropical seas' (350; 586).
'widespread in all except the coldest waters . . . widely distributed species in the Gulf of Guinea' (535).
[As *Gracilaria confervoides* (L.) Greville]
Angola (239).
Cameroun (239; 454; 500).
Canaries (70; 191; 252).
Congo (239; 249; 250).
Guinea-Bissau (529).
Mauritanie (252).
Namibia (162; 274; 500).
St Helena (269).
São Tomé (93).
Sénégal (99; 252; 529; 531).
Sénégal (Casamance) (99).
Sierra Leone (30).

Western Sahara (476).
'Atlantic Ocean (. . . African . . . coasts, Canary Islands . . .)' (177).
'Cosmopolite dans les mers tempérées et chaudes' (189).
'der ganzen westafricanischen Küste' (239).
[As *Gracilaria confervoides* Lamouroux]
Cameroun (239).
Ghana (153; 338).
Sénégal (Casamance) (122).
[As *Gracilaria confervoides* Greville]
Angola (41; 42).
[As *Gigartina confervoides* (L.) Lamouroux]
Canaries (401).
Note. Drift material only.
[As *Gigartina confervoides* Lamouroux]
Canaries (44).
[As *Sphaerococcus confervoides* (L.) C. Agardh]
'In mari Atlantico, ab Anglia usque ad Africam, vulgaris.' (19).
'In mari . . . atlantico . . . Africano' (318).
[As *Sphaerococcus confervoides* (L.) C. Ag. *β Procerrimus* (Esper) Turner]
'Cum priore' [= entry above] (19).
[As *Sphaerococcus confervoides* Ag.]
Canaries (385).

Note. The Sénégal record first established in Dangeard (122) may be doubtful; Bodard & Mollion (59), for the same coast, stated: 'nous n'avous pas trouvé le *G. verrucosa* contrairement à ce qui a été écrit précédemment, c'est vraisemblablement *Gracilariopsis Sjostedtii* [= *Gracilaria lemaneiformis* (Bory) Weber-van Bosse] qui a été donné sous ce nom, sa répartition géographique est sûrement beaucoup plus vaste que ne l'indiquent les références actuelles.'

Recent studies by Bird, van der Meer & McLachlan (1982) and by Gargiulo, De Masi & Tripodi (1985) have established that records of *Gracilaria verrucosa* (Hudson) Papenfuss throughout the world need reservation in their acceptance and, often, critical re-evaluation. The recent description by Gargiulo, De Masi & Tripodi (loc. cit.) of the segregate species *Gracilaria dendroides* from the Bay of Naples is a case in point. Certain of the records noted above are clearly doubtful and require re-analysis; many of the remainder would benefit from re-affirmation. For the present, we merely repeat all detected sources of data.

Gracilaria wrightii (Turner) J. Agardh [or simply J. Agardh]
See *Polycavernosa henriquesiana* (Hariot) Chang & Xia.

Gracilaria spp.
Canaries (66).
Cape Verde Islands (445; 446).
Côte d'Ivoire (288).
Ghana (92; 297; 299; 376; 377; 394; 487; 491; 537; 567).
Mauritanie (349; 395; 476; 533).
São Tomé (93; 535).
Sénégal (48; 529; 531; 542).
Sierra Leone (374).
Western Sahara (349; 393; 394; 395; 476).
'West Africa' (290; 345; 479).
'African west coast' (374).

Note. Bodard (52: 36) considered the Sourie (529) Sénégal records of '*Gracilaria* type D' to relate to *Gracilaria damaecornis* J. Agardh (q.v.) and of '*Gracilaria* sp. 2' to relate (Bodard, 52: 38) to *Polycavernosa [Gracilaria] dentata* (J. Agardh) G. Lawson et D. John (q.v.). The records are also entered here for completeness of recording.

All the records of Lawson & John (349) from Western Sahara are secondarily based on extant information in the literature. Piccone (445: 72) gave an entry headed '*Gracilaria*?', in which he attributed with doubt two young sterile individuals found on larger algae. Material collected by John (288) from Côte

d'Ivoire was suggestive, from its flattened nature and its branching, of *Gracilaria foliifera* (now *G. multipartita*, q.v.).

Gracilariopsis
Differences in the *Gracilaria* cystocarp ontogeny were recognized and presented by Sjöstedt (1926), when he dealt with the structure of the gonimoblast. The differences were emphasised by Dawson (1949) in erecting the genus *Gracilariopsis*, although this latter was subsequently synonymized with *Gracilaria* by Papenfuss (433). Authors have not universally accepted that synonymy (e.g. Umamaheswara Rao, 1972).

Gracilariopsis camerunensis (Pilger) Bodard
See *Gracilaria camerunensis* Pilger.

Gracilariopsis ? disputabilis Bodard
See *Gracilaria disputabilis* (Bodard) Bodard.

Gracilariopsis lemanaeformis (Bory) Dawson, Acleto & Foldvik
See *Gracilaria lemaneiformis* (Bory) Weber-van Bosse.

Gracilariopsis sjoestedtii (Kylin) Dawson
See *Gracilaria lemaneiformis* (Bory) Weber-van Bosse.

Gracilariopsis (?) **tridactylites** Cr. fr. (= J. Ag.?) M. Bodard, comb. nov.
See *Gracilaria disputabilis* (Bodard) Bodard.

Gracilariopsis sp.
Sénégal (48).
Note. Bodard (48: 877) indicated this to be a dorsiventral growth-form.

Polycavernosa Chang & Xia
For detailed elucidation of the background to the distinguishing features of this genus, and analysis of its relationship to *Gracilaria* Greville (from which it is a potential segregate), see Xia & Abbott (571; 600) and Chang & Xia (572). The distinctions between the genera are not regarded by all workers as sufficient to justify separation, although Xia & Abbott (600: 415–417) have recently strongly reiterated their belief in that separation, at least at subgeneric level.

The major distinctions involved are two-fold and clearly laid out in tabular form by Xia & Abbott (600: Table 1). They concern the spermatangial ontogeny and the origin of the gonimoblast. In this 1987 paper (600), Xia & Abbott also introduced a previously unremarked spermatangial difference between *Polycavernosa* and *Gracilaria* – the production of clusters of spermatangia isolatedly spread over the thallus surface in species attributable to *Polycavernosa* (a distribution pattern easily missed in sections, leading to a conclusion of sterility), as opposed to the numerous spread-out (not clustered) spermatangial conceptacles occurring densely over the plant surface in *Gracilaria* (*verrucosa* – type spermatangia). Xia & Abbott (600: 416–417) acknowledged that the spermatangial differences are the more important for placement of plants in *Polycavernosa* or *Gracilaria*, and that gominoblastic characteristics then best separate the species in *Polycavernosa*. Remarking that most of the nomenclatural and taxonomic problems that exist are within the limits of *Gracilaria* (sensu stricto), they added that these more easily demonstrable spermatangial characteristics 'are an important companion . . . to the equally or more important, but more difficult to demonstrate, origin of the gominoblast.'

Difficulties of allocation of species to one or the other of these two groups arise principally from a lack of critical definitive data on aspects of the developmental morphology, and it will be interesting to see if future extension of available information continues to support the postulate of two well-founded genera (or sub-genera) within the overall grouping of gracilarioid plants.

Polycavernosa debilis (Forsskål) Fredericq & Norris
Note. See the entry for *Polycavernosa henriquesiana* (Hariot) Chang & Xia. The present taxon, hitherto combined in *Gracilaria*, has been transferred to the segregate genus *Polycavernosa* Chang & Xia. For details, see Fredericq & Norris (1985), Xia & Abbott (571), and Chang & Xia (572). For data on life-history phases of *P. debilis*, see Littler et al. (1987). For possible complications and variable applications of the epithet *debilis* in these genera, see Xia & Abbott (600: Table 2 and footnote, p. 416).

Polycavernosa dentata (J. Agardh) G. Lawson & D. John
Cameroun (586).
Côte d'Ivoire (586).
Gabon (586).
Gambia (586).
Ghana (586).
Liberia (586).
Nigeria (586).
São Tomé (586).
Sénégal (Casamance) (586).
'mainland coast of tropical West Africa' (586).
[As *Gracilaria dentata* J. Agardh]
Angola (298; 352).
Cameroun (52; 213; 288; 350; 454; 535).
Cape Verde Islands (38; 74; 139; 140; 213; 598).
Congo (249; 250; 535).
Côte d'Ivoire (52; 287; 288; 350).
French Equatorial Africa [probably Gabon] (213).
Gabon (294; 350).
Gambia (296; 350; 535).
Ghana (213; 288; 291; 292; 297; 350; 418; 491; 535; 579).
Liberia (129; 287; 288; 350).
Nigeria (213; 288; 350; 535).
São Tomé (93; 213; 288; 350; 535).
Sénégal (38; 48; 50; 51; 52; 59; 74; 122; 213; 249; 529; 535).
Sénégal (Casmanace) (52; 350).
Senegambia (25; 27; 132; 139; 296; 410; 454; 483).
'connue de tout l'Atlantique tropical' (52).
'Gulf of Guinea' (535).
'l'aire se limite au golfe du Bénin et à la Mauritanie' (59).
'Northwestern Africa' (540).
'probably in most warm temperate and tropical seas' (350).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Tropical Africa (N. Gambia – Congo river)' (598).
[As *Gracilaria dentata* Greville]
Cape Verde Islands (483).
[As *Gracilaria dentata* P. Dangeard]
Sénégal (55; 59; 399).
[As *Gracilaria corticata* J. Agardh]
Cape Verde Islands (38).
[As *Gracilaria henriquesiana* Hariot]
Côte d'Ivoire (59).
Ghana (45; 153; 335; 338; 340; 344; 350; 374; 418; 419; 535; 537; 593; 594; 609).
São Tomé (419; 535).
Sénégal (55; 59; 394; 398; 399).
'West Africa' (45).
'coast of the Gulf of Guinea' (269).
'l'aire se limite au golfe du Bénin et à la Mauritanie' (59).
[As *Polycavernosa henriquesiana* (Hariot) Chang & Xia]
Ghana (571; 572).
[As *Gracilaria foliifera* (Forsskål) Børg.]
?Guinea-Bissau (529).
?Sénégal (529).

[As *Sphaerococcus rangiferinus* Kützing]
Congo (249).
[As *Sphaerococcus oligacanthus* Kützing]
Congo (249).
Senegambia (326).
[As *Gracilaria* sp. 2]
Sénégal (529).

Note. Bodard (52: 38) considered this 'sp. 2' of Sourie (529) to be '*Gracilaria dentata* J. Ag.' [see *Polycavernosa dentata* (J. Agardh) G. Lawson & D. John]. Even the attribution here of the records established in Sourie (529) as *Gracilaria foliifera* (Forsskål) Børgesen [= *Gracilaria multipartita* (Clemente) Harvey] must remain in some doubt, since Sourie stated (p. 116): 'les échantillons rapportées à cette espèce ne le sont qu'avec incertitude, selon Feldmann ils pourraient être aussi des formes de *G. foliifera* (Forsk.) Boergs., très polymorphe.'

Askenasy (38: 168) noted under his entry for *Gracilaria dentata* J. Ag.: 'Je possède un exemplaire de cette algue provenant de l'herbier Lenormand et étiqueté: *Gracilaria corticata* J. Ag. Ins. Sal. Cap de Verde, Forbes I.'

Of the Kützing (326) record for Senegambia, Pilger (454: 302) commented 'von Senegambien beschrieb Kützing *Sphaerococcus oligacanthus*, der zu unserer Art gezogen wird'.

The Hornemann record (271), under *Fucus aeruginosus* Turner, from Danish Guinea [= Ghana] and published in 1819, may have involved the present species, or *Gracilaria multipartita* (Clemente) Harvey, or both plus *Gracilaria corticata* J. Agardh. See the fuller note to *G. multipartita* (Clemente) Harvey for details.

See also the entries for *Gracilaria angustissima* (Harvey) Bodard and *Gracilaria* spp.

General note.

Abbott (see 571; 572) has accepted *Polycavernosa* as a good genus; she (in litt. to DMJ, 1986) believes, on the basis of examination of types, that *Sphaerococcus rangiferinus* Kützing and *Gracilaria dentata* J. Agardh are synonymous, but not so with the type of *Gracilaria henriquesiana* Hariot [*Polycavernosa henriquesiana* (Hariot) Chang & Xia]. The first publication of the name *Sphaerococcus rangiferinus* (Kützing, 318: 779), the basionym for Abbott's proposed (in litt.) recombination in *Gracilaria*, cites Kützing's own *Sphaerococcus cervicornis* (Kützing, 316: Tab, 62, Fig. II) in synonymy. This, in turn, refers back to C. Agardh (19: 292–293) and thence to Dawson Turner (*Fuci . . .*, tab. 121). Kützing's own *S. cervicornis* is illustrated as a tetrasporangial plant in apical longitudinal section (Fig. II, 2) and in gross morphology (fig. II, 1); no indication is given of spermatangial material, even if such were present. Abbott, in recently commenting (litt., 11 Dec. 1986) on her examination and acceptance of the equivalence of application in the epithets *rangiferinus* Kützing and *dentata* J. Agardh (see above), made no mention of spermatangial material being present. There is thus insufficient evidence from the available *rangiferinus* material of the latter being the earliest epithet to apply in *Polycavernosa* and further work is required if such is ever to be established. By contrast, evidence for the application of *dentata* in the genus *Polycavernosa* is provided by material referred to by Ohmi (1968), in error as *Gracilaria henriquesiana*, following Lawson's and Dickinson & Foote's earlier publications. For further detailed data, see Lawson & John (586). It is perhaps for this reason that Abbott (in litt.) has proposed the transfer of *rangiferinus* not (as might be expected) to *Polycavernosa*, but to *Gracilaria*. If *G. dentata* is correctly transferred to *Polycavernosa*, on acceptance of the distinctness of the latter genus, and if Abbott is correct as to the *rangiferinus/dentata* synonymy, then *rangiferina* will require transfer to *Polycavernosa* and, being the earliest epithet, will replace the name *P. dentata* (J. Agardh) G. Lawson & D. John by the combination *P. rangiferina*. This should perhaps be carried out for rationalisation purposes until (if ever) the type material of *S. rangiferinus* Kützing can be definitively shown to be correctly associated with one or the other genus. We hesitate currently to effect the recombination here, even provisionally, in view of the obvious intention toward further work on the matter expressed in letters from Abbott (supr. cit.). As indicated above, this presupposes acceptance of a real generic distinction between *Gracilaria* and *Polycavernosa*, a matter on which there is no unanimity of opinion. We remain willing to be convinced fully, but are currently sufficiently so to effect support at least the recombination of *dentata* in *Polycavernosa* (586).

In the matter of the identity of material referred to by Hornemann (271) as *Fucus aeruginosus* Turner, which could have involved *Gracilaria [Polycavernosa] dentata* (inter alia), see the notes to *Gracilaria multipartita* (Clemente) Harvey and *Gracilaria corticata* J. Agardh. See, finally, the entry for *Gracilaria angustissima* (Harvey) Bodard.

Polycavernosa domingensis (Kützing) J. Price & D. John, **comb. nov.**
[Basiomyn: *Sphaerococcus Domingensis* Kützing, *Tab. Phyc.* **19**: 8, no. 4254, Tab. 22 (1869).]

Note. See the note to *Gracilaria cervicornis* (Turner) J. Agardh. This present recombination in *Polycavernosa* is carried out for rationalisation purposes, the basionym having been applied to plants which share certain morphological similarities with *G. cervicornis* but separable because of the occurrence of spermatangia 'in deep crypts' and the possession of a thin cortex of subquadrate cells.

Polycavernosa henriquesiana (Hariot) Chang & Xia
'Atlantic Africa' (600).
[As *Gracilaria henriquesiana* Hariot]
São Tomé (59; 137; 139; 213; 251; 350; 390; 485; 535; 586).
'in the tropical eastern Atlantic Ocean.' (586).
[As *Gracilaria henriquesii* P. Hariot]
São Tomé (265).
[As *Gracilaria wrightii* (Turner) J. Agardh]
São Tomé (251; 264; 265; 535).
[As *Gracilaria wrightii* J. Agardh]
São Tomé (263; 264).

Note. Steentoft (535: 133) stated this taxon to be endemic to São Tomé. Records under this name from elsewhere in the list area have been taken, from experience, to have been inaccurately determined and to relate correctly to finds of *Polycavernosa dentata* (q.v.). In the absence of either spermatangial material required for confirmation, or sufficiently definite and clear statements for dependable reallocation without examination, the São Tomé records are retained until further study, but they could also prove to be *P. dentata*.

Reallocation here of records for São Tomé reported under the name *Gracilaria wrightii* (Turner) J. Agardh *is* a matter of redetermination, not of nomenclatural equivalence. *G. wrightii* is currently considered to be a synonym of *Gracilaria debilis* (Forsskål) Børgesen (q.v.) [= *Polycavernosa debilis* (Forsskål) Fredericq & J. Norris].

Hariot (251), Hariot in De Toni (137) and De Toni (139) all include the comment 'affine a *G. potei* e *G. corticata*', either as succinctly as that (137), or in greater detail but with the same background (251; 139).

More recent work by Steentoft (pers. comm., 3 March 1987) has shown that the type material of *Gracilaria henriquesiana* (Ribeiro 14) in Coimbra (COI) includes both male and female plants. The males possess spermatangia in deep crypts in the thallus surface – hence the acceptance here of the combination in *Polycavernosa*.

Grallatoria tingitana (Schousboe ex Bornet) Abbott
See *Callithamniella tingitana* (Schousboe ex Bornet) Feldmann-Mazoyer.

Grateloupia
For cogent comment on generic and some specific criteria within the family Cryptonemiaceae, see Kraft (1977).

Grateloupia dichotoma J. Agardh
Canaries (33; 70; 89; 108; 184; 188; 191; 214; 227; 273; 350; 379; 403; 499; 547; 584; 586; 598).
'Atlantique (de l'Angleterre aux Canaries . . .)' (33).
'Atlantique tempéré et chaud (de la Manche aux Canaries . . .) (188).
'British Isles southwards to Canary Isles; . . . probably more widespread than present records suggest.' (273).
'côtes occidentales d'Afrique et aux Canaries' (89).
'Im Atlantischen Ozean von der englischen und normannischen Küste südwärts bis nach Kamerun' (498; 499).
'Nordwestafrika.' (499).
'Tropical Africa (N. Gambia – Congo river)' (598).
'warmer parts of the Atlantic Ocean' (60; 70).
[As *Chondrus crispus* Lyngbye]
Canaries (44; 401; 403).

Note. Montagne (403: 103) reattributed the material he previously (401) called *Chondrus crispus* Lyngbye to the present taxon in stating (under his entry for *Grateloupia fimbriata* Montagne):

> 'cette Algue ne pourrait pas être une forme contractée du *G. dichotoma* J. Ag. mais je n'ai vu aucune transition entre les deux espèces . . . ce que j'ai donné autrefois avec doute

(*Cryptogamie des Canaries*, p. 157) comme le *Chondrus crispus* appartient au *G. dichotoma*. Le *G. fimbriata* a encore des caractères communs avec le *G. Proteus* Kütz. trop incomplétement décrit.'

Børgesen (70), who examined a small specimen from Montagne's Herbarium, concluded that Montagne's later assessment was correct and his opinion was requoted by Ardré (33: 125) in her entry for *Chondrus crispus* (L.) Lyngbye, although she was in error in implying that Børgesen had been the first to show this:

'rappelons que Börgesen (1929) a montré que le *Chondrus crispus* des Iles Canaries (Montagne, 1840 [sic!]) était un *Grateloupia dichotoma*.'

De Toni (134: 1559, no 6) had the situation assessed correctly when, under *G. dichotoma* synonymy, he commented: '*Chondrus crispus* Mont. Canar. p. 157 (fide auctoris).' Since the list in his work is based directly on Montagne's 1841 data (401), Benítez's (1928) record (in 44) is also attributed here.

Lawson & John (350; 586) have correctly observed that doubt attaches to Schmidt's (498) comment (repeated in 499) on distribution southwards to Cameroun. Although there is no very good theoretical reason for its not being present throughout the mainland Gulf of Guinea area, intensive and widespread collecting throughout both mainland and islands coastlines has failed to establish authentic records. No supporting specimens in any collections with connection to Schmidt have been located.

Grateloupia doryphora (Montagne) Howe
Angola (273; 577).
Canaries (18; 598).
Côte d'Ivoire (288; 350; 586).
Gambia (18; 296; 350; 586).
Ghana (18; 273; 288; 299; 350; 376; 577; 586).
Liberia (129; 288; 350; 586).
Mauritanie (349).
Sénégal (577).
Senegambia (24; 296).
'Portugal to Ghana; Angola' (273).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Tropical Africa (N. of Gambia – Congo river)' (598).
'widespread in warm temperate and tropical seas' (350; 586).
'entre las costas de Gambia y Ghana' (18).
[As *Grateloupia lanceola* J. Agardh]
Angola (41; 42; 273).
Guinea-Bissau (529).
Mauritanie (529).
Sénégal (47; 50; 59; 122; 221; 529; 530; 542).
Senegambia (24; 134).
'Atlantic (North Africa)' (410).
'Atlantique tropicale' (529).
'Du sud de l'Espagne au Sénégal' (89; 542).
'In atlantico ad littus Africae superioris' (27).
'pantropicale' (59).
[As *Grateloupia lanceolata*]
Sénégal (411).
[As *Grateloupia gibbesii* Harvey]
Ghana (153).
'de l'Atlantique oriental chaud' (588).

Note. Specimens attributed under this name are often very variable, from narrow lanceolate plants with marginal proliferations to wider, almost undivided fronds.

The conspecificity of *Grateloupia lanceola* J. Agardh emend. Ardré & Gayral was finally established and properly published by Dawson, Acleto & Foldvik (1964), after Ardré & Gayral (588) had carried out preliminary rationalisation of many previous combinations into the synonymy of the there-accepted *Grateloupia lanceola* J. Agardh. See also the notes for *Grateloupia senegalensis* Bodard.

Grateloupia filicina Lamouroux) C. Agardh
Angola (298; 352).
Benin (288; 293; 350; 586).
Cameroun (288; 350).
Canaries (50; 142; 145; 227; 584).
Cape Verde Islands (50).
Côte d'Ivoire (50; 59; 287; 288; 290; 350; 394; 586).
Gambia (296; 350; 586).
Ghana (153; 287; 288; 290; 291; 344; 350; 586).
Liberia (129; 287; 350; 586).
Mauritanie (349).
Namibia (348; 522).
Nigeria (288; 350; 586).
St Helena (142).
Sénégal (50; 59).
Senegambia (24).
Togo (288; 293; 350; 586).
'Atlantique (de l'Angleterre à la Mauritanie)' (33).
'de l'Angleterre jusqu'en Cap de Bonne Espérance' (553).
'pantropicale' (59).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara] (598).
'Tropical Africa (N. Gambia – Congo river)' (598).
'widespread in warm temperate and tropical seas' (350; 586).
[As *Grateloupia filicina* (Wulfen) C. Agardh]
Cameroun (213; 500).
Canaries (24; 50; 70; 134; 191; 213; 499; 500).
Gambia (296).
Ghana (154; 213).
Namibia (522A).
Nigeria (213).
Sénégal (50; 55; 122; 213).
Senegambia (296).
'Atlantique: depuis la côte meridionale des îles britanniques jusqu'en Mauritanie' (222).
'Atlantique, des côtes d'Angleterre jusqu' au Cap de Bonne Espérance' (553).
'Nordwestafrika' (499).
'Sans doute cosmopolite dans toutes les mers chaudes' (188).
'Seems to occur in all warmer seas' (60; 70).
'von Marokko bis zum Kap der Guten Hoffnung' (239).
'wärmeren atlantischen Ocean bis zum Cap der guten Hoffnung' (509).
'Westafrika' (499).
[As *Grateloupia filicina* Wulfen]
Canaries (142; 391).
St Helena (142; 391).
[As *Grateloupia filicina* (Wulfen in Jacquin) C. Agardh]
Canaries (24; 108).
[As *Grateloupia filicina* C. Agardh]
St Helena (260).
'Atlantic (as far as the Cape of Good Hope)' (410).
'Du sud de l'Angleterre aux Canaries' (89).
'Probablement cosmopolite dans les mers chaudes' (221).
[As *Grateloupia filicina* (Wulfen) J. Agardh]
Cameroun (454).
Togo (454).
[As *Grateloupia filicina* (Lamouroux) C. Agardh var. *luxurians* A. & E. S. Gepp]

'Gulf of Guinea to South Africa' (273).
'Some of the large and well-developed plants found in the Gulf of Guinea are close to variety *luxurians*' (350; 586).
[As *Grateloupia filicina* (Lamouroux) C. Agardh var. *filicina*]
'British Isles to S. Africa' (273).
[As *Grateloupia filicina* [vars. authority combinations] var. *ramentacea*]
St Helena (142; 260; 391).
[As *Grateloupia filicina* forma *filiformis* (Kützing) Pilger]
Cameroun (139; 454).

Grateloupia fimbriata Montagne
See the notes at *Grateloupia dichotoma* J. Agardh.

Grateloupia gibbesii Harvey
See *Grateloupia doryphora* (Montagne) Howe.

Grateloupia lanceola J. Agardh
See *Grateloupia doryphora* (Montagne) Howe.

Grateloupia proteus Kützing
See the notes at *Grateloupia dichotoma* J. Agardh.

Grateloupia scutellata Kützing
Cape Verde Islands (38; 134; 325; 597; 598).
Note. Kützing's (1867) original description (325: 8) stated the location simply as '"Cap. vert." Bolle.' This was reported in De Toni (134: 1572) as '"Caput Viride" (Bolle)', the species being recorded as one of the 'Species minus cognitae', with the terminal comment 'An reverea *Grateloupia*?' Askenasy (38: 173) indicated that the specimens collected by Cardoso were determined by Bornet, apparently with little doubt as to generic attribution because some of the material was cystocarpic. Prud'homme van Reine & Lobin (597) similarly omitted any indications of doubt in indicating the species as endemic to the Cape Verde Islands.

Grateloupia senegalensis Bodard
Sénégal (47; 50).
Note. Bodard (47) presented in key and descriptive forms the distinctions between his new species and the very similar *G. lanceola* J. Agardh [= *G. doryphora* (Montagne) Howe]. According to Bodard (l.c.), this species and the rest of the interesting associated tropical flora do not go further north along the African coast than Pointe de Sarène, therefore not reaching the Cape Vert peninsula.

Grateloupia spp.
Sénégal (50).
Note. The listings in Bodard (50) refer to *Grateloupia filicina*, *Grateloupia lanceola*, and *Grateloupia senegalensis*. The collective *Grateloupia* spp. is also used elsewhere, implying that there may have been other taxa suspected as present. We refer here to the record simply to draw attention to that possibility.

Griffithsia
The limits of subgeneric taxa, in all cases where only vegetative material is available for determination amongst routine field or laboratory determinations, appear difficult at best and often impossible to establish with certainty. Thus, many of the records listed in the entries which follow are necessarily subject to considerable reservation, aside from any definite differences of taxonomic opinion. Comments are made where appropriate, but it may be taken that confirmation would be desirable in most cases.

Griffithsia arachnoidea C. Agardh
Canaries (44; 71; 177; 318; 320; 401).
[As *Griffithsia furcellata* J. Agardh]
Canaries (89; 128A; 133; 227; 547; 584; 598).
Cape Verde Islands (598).
[As *Corynospora furcellata* (J. Agardh) Levring]
Canaries (38D; 375).

[As *Neomonospora furcellata* (J. Agardh) G. Feldmann & Meslin]
Canaries (33; 177; 190; 191; 196; 221; 222).
'Atlantique (côte de France et Canaries . . .)' (33; 190).
'Atlantique: côtes de France jusqu'aux Canaries et Maroc' (222).

Note. The taxon (as *Corynospora furcellata* (J. Agardh) Levring) has also been reported from various locations in Madeira. It is necessary to avoid confusion with *Corynospora arachnoidea* Harvey, now known as *Mazoyerella arachnoidea* (Harvey) Gordon-Mills & Womersley.

The conspecificity of *G. arachnoidea* C. Agardh and *G. furcellata* J. Agardh has often been stated in the literature, but it was not until Børgesen's (71: 29) treatment that use of the earlier name *G. arachnoidea* was resumed for the combined taxon. Even then (as will be clear from the above), there has been little consistency in the approach. It has more recently been suggested that *Griffithsia furcellata* J. Agardh should be transferred to *Anotrichium furcellatum* (J. Agardh) Baldock (see Baldock, 1976: 560), perhaps indicating that reconsideration as to the conspecificity of *G. arachnoidea* and *G. furcellata* may here be required on an individual record basis. The entry for *Monosporus pedicellatus* (J. E. Smith) Solier will present reasoning on the segregate genus *Anotrichium*. Accuracy of determination on an individual record basis may be further complicated by the possibility that *A. furcellatum* (J. Agardh) Baldock may be conspecific with *Anotrichium multiramosum* (Setchell & Gardner) Baldock.

Griffithsia argus Montagne
See *Wrangelia argus* (Montagne) Montagne.

Griffithsia barbata (J. E. Smith) C. Agardh [and other authority combinations]
See *Anotrichium barbatum* (C. Agardh) Nägeli.

Griffithsia capitata Børgesen
Canaries (4; 71; 191; 227; 375).
Salvage Islands (598).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).

Note. According to Børgesen (71: 37–38), some high degree of overlap with *Griffithsia globifera* (Harvey) J. Agardh, *Griffithsia* ? *phyllamphora* Kützing, *Griffithsia schousboei* Montagne, *Griffithsia opuntioides* J. Agardh, and *Griffithsia corallinoides* (L.) Batters occurs. However, all these taxa show some differences and are therefore not synonymous (Børgesen, 71).

Griffithsia confervoides Suhr
Namibia (522A).

Note. See the notes to the entry for *Griffithsia cymosa* Simons and those to *Griffithsia corallinoides* (L.) Batters. The present taxon in all probability includes *Griffithsia cymosa* Simons, as indicated by Simons et al. (522A) and Stegenga (599: 114).

Griffithsia corallina (Lightfoot) C. Agardh [or C. Agardh]
See *Griffithsia corallinoides* (L.) Batters.

Griffithsia corallinoides (L.) Batters
Canaries (227).
'Atlantique [de la Scandinavie au Maroc (?)]' (33).
[As *Griffithsia corallina* (Lightfoot) C. Agardh]
Canaries (318; 401).
[As *Griffithsia corallina* C. Agardh]
Canaries (44; 401).
[As *Griffithsia corallina* (J. E. Smith) C. Agardh]
Canaries (268).
[As *Griffithsia corallina* (Lightfoot) J. Agardh]
Canaries (24).
[As *Griffithsia corallina* var. ? *tenuior*]
'in mari Atlantico et Mediterraneo' (21).

Note. Considerable doubt attaches to the validity of Canaries reports of this taxon. All those trace back directly or indirectly to that in Montagne (401), which record was based on sterile (i.e. non-reproductive) material. Børgesen (71) was unable to trace specimens in Herb. Montagne and therefore doubted the accuracy of the determination. Many other expressions of that same doubt have been published, both before and subsequent to Børgesen's statement – for example, in J. Agardh (1851), based directly on

Montagne's (1841) record, 'sed sterilis et hinc forsan specie dubia'; in Ardré (33: 170), who similarly repeated the doubt already expressed by Dangeard (118) in establishing his record from Morocco; and in others. The real attribution of material to which the name *G. corallina* [*corallinoides*] has been applied probably varied; both *Griffithsia schousboei* Montagne and *Neomonospora furcellata* (J. Agardh) G. Feldmann & Meslin [= *Griffithsia arachnoidea* C. Agardh] have been invoked at times (e.g. in Ardré; 33). Seagrief (570) considered *G. corallina* of Barton, from the Cape, to be a synonym of *Griffithsia confervoides* Suhr. See also the notes to *G. capitata* Børgesen.

Griffithsia cymosa Simons
Namibia (348; 521; 522; 599).

Note. Simons (521: 1; 4–5) indicated his newly-described taxon as clearly a *Griffithsia* but with some atypical features in regard to the nature of branchlets on the cystocarp-bearing dwarf-shoot and the arrangement of the cystocarps. Procarps and cystocarps were all the reproductive stages seen. Stegenga (599: 114), referring to Simons' *G. cymosa*, commented: 'the morphology of the Namibian *Griffithsia cymosa* Simons (Simons 1970) is such as to make conspecificity with *G. confervoides* [Suhr] likely.' Stegenga had already indicated *G. confervoides* as the most common species of *Griffithsia* around the Cape Peninsula and vicinity. The Simons data for Namibia (522) were repeated by Lawson & Isaac (348). See the entry for *Griffithsia confervoides* Suhr.

Griffithsia flosculosa (Ellis) Batters
Canaries (33; 128A; 191; 227; 306B; 517; 584; 598).
'Atlantico de Inglaterra a Canarias' (517).
'Atlantique (de l'Angleterre aux Canaries)' (33).
[As *Griffithsia setacea* (Ellis) C. Agardh]
Canaries (71; 133; 318; 401).
St Helena (401).
'English coast down to the Canary Islands' (71).
[As *Griffithsia setacea* C. Agardh]
Canaries (44; 89; 401).
St Helena (260).
'D'Angleterre aux Canaries' (89).
[As *Griffithsia setacea* Ellis]
Canaries (24; 142; 391).
St Helena (142; 391).
[As *Griffithsia setacea* J. Agardh var. *sphaerica* (Schousboe ex C. Ag.) G. Feldm.-Mazoyer]
Canaries (89).
[As *Griffithsia setacea* (Ellis) C. Agardh var. *sphaerica*]
Canaries (71).

Note. Many of the records cited for the Canaries are based solely and directly on the early report by Montagne (401). Since Montagne stated 'in rupibus maritimis canariae sed sterilis lecta', there inevitably exists some doubt (sometimes openly expressed; e.g. in 71; 227) as to the determinations. Similar doubt applies for St Helena (e.g. 391). The 'var. *sphaerica*' seems likely to be of doubtful validity. Baldock (1976: 510; 563–566) considered that this species (cited as *Griffithsia setacea* (Ellis) C. Agardh) 'should probably be referred to *Halurus*'.

Griffithsia furcellata J. Agardh
See *Griffithsia arachnoidea* C. Agardh.

Griffithsia globifera (Harvey) J. Agardh
See the notes to *Griffithsia capitata* Børgesen and *Griffithsia schousboei* Montagne.

Griffithsia opuntioides J. Agardh
Angola (352).
Canaries (3; 4; 5; 16; 33; 71; 89; 128A; 191; 225; 227; 229; 375; 379; 547; 584; 598; 604; 605).
Guinea-Bissau (529).
Sénégal (529).
Western Sahara? (349).
'[Africa] north of the Gulf of Guinea' (352).
'Angola . . . occurs to the north of the Gulf of Guinea . . . but not in the Gulf itself' (487).

Note. Also known from Madeira (375). See the notes for the entries on *Griffithsia capitata* Børgesen, *Griffithsia schousboei* Montagne and *Griffithsia* sp.

Griffithsia phyllamphora J. Agardh
Canaries (5; 13; 71; 89; 139; 191; 196; 227; 392; 489; 490; 499; 547; 584; 598; 604; 605).
'nordwestafrikanische Küste' (499).
Note. According to Børgesen (71), this taxon is not the same as *G. phyllamphora* of Kützing, which may be the same as *G. capitata* of Børgesen (q.v. as to the notes).

Griffithsia radicans Kützing
Canaries (13; 227; 598).
Note. This taxon was based on material from Brasil and clearly left at least De Toni (133; 1287) in some doubt as to placement, since he included it in his 'Species . . . quod sectionem dubiae' with the comment 'An *Spermothamnion*?'. Taylor (540: 515–516) merely described the taxon, without further comment, and indicated it as from Brasil.

Griffithsia schousboei Montagne
Canaries (24; 33; 38D; 44; 71; 89; 128A; 133; 177; 191; 196; 227; 306B; 375; 401; 405; 406; 407; 493; 547; 584; 598).
Côte d'Ivoire (287; 288; 350; 586).
Ghana (287; 288; 350; 586; 590).
Guinée (287).
Western Sahara ? (349).
'Atlantic Ocean (from the Bay of Biscay to Canary Islands)' (177).
'Atlantic (S. Europe & N. Africa)' (410).
'Atlantique, de la côte Basque aux Canaries' (191; 196).
'Du golfe de Gascogne aux Canaries' (89).
'Golfe de Gascogne southwards to the Canary Islands' (71).
'in vicino Atlantico ad Tingin et ins. canarias' (133).
'in warm temperate and tropical parts of the Atlantic Ocean' (350; 586; 590).
'Tropical Africa (N. Gambia – Congo river)' (598).
[As *Gr. [iffithsia] Schousboei* Mont. in Park. Webb.]
'In mari adriatico, mediterraneo et atlantico ad oras Europae meridionalis et Africae' (318).
[As *Griffithsia schousboei* var. *minor* J. Feldmann]
'Atlantique tempéré chaud, de la côte basque aux Canaries' (190).
'Du Golfe de Gascogne aux Canaries' (89).
Note. Apparently widely recorded, and also known from Madeira (375). Some doubt attaches to the original Montagne record for the Canaries (401); Børgesen (71), without having seen the plants, stated that Montagne's material was sterile and the determination therefore doubtful. Sauvageau (493) believed it to be either *G. schousboei* or *Griffithsia opuntioides* J. Agardh (q.v.). See also the notes to *Griffithsia capitata* Børgesen and *Griffithsia* sp. Norris & Bucher (416: 203) also indicated a relationship between *G. globifera* (Harvey) J. Agardh and *G. schousboei*; these, morphologically similar, are most easily separated by the form of the spermatangia (the former lacks an involucre; the latter has one).

Griffithsia secunda Harvey ex J. Agardh
See *Anotrichium tenue* (C. Agardh) Nägeli (notes to the entry).

Griffithsia setacea (Ellis) C. Agardh [or C. Agardh]
See *Griffithsia flosculosa* (Ellis) Batters.

Griffithsia tenuis C. Agardh
See *Anotrichium tenue* (C. Agardh) Nägeli.

Griffithsia sp.
Ghana (299; 300; 350; 376; 377; 491; 586).
Sénégal (59; 529).
Sierra Leone (31).
Western Sahara (349).
Note. Lawson & John (349: 114) originally indicated close vegetative correspondence to *Griffithsia*

schousboei and *G. opuntioides* (branches of both with large obovoid to barrel-shaped cells); they were unable to decide further since all the material lacked reproductive organs (the position of spermatangial sori is the determinant).

Ghanaian material of the genus also presents difficulties (350: 330; 586: 275) since narrow elongate vegetative filament cells on some specimens indicate the existence of a further species to *G. schousboei*. Again, absence of reproductive structures does not permit certainty, even (in this case) of generic attribution (cf. also 300; 376).

Gulsonia annulata Harvey
See the notes to *Gulsonia ecorticata* G. Lawson & D. John.

Gulsonia ecorticata G. Lawson & D. John
Ghana (350; 377; 586).
'in the tropical eastern Atlantic Ocean' (350; 586).
'Tropical Africa (N. Gambia – Congo river)' (598).
[As *Gulsonia* sp.]
Ghana (299; 376; 491).

Note. Distinctions between *Gulsonia ecorticata*, *G. annulata* Harvey, and *G. mediterranea* Kylin are outlined in Lawson & John (350; 586).

Gulsonia mediterranea Kylin
See the notes to *Gulsonia ecorticata* G. Lawson & D. John.

Gulsonia sp.
See *Gulsonia ecorticata* G. Lawson & D. John.

Gymnogongrus
For a recent consideration of the generic background, see Schotter et al. (514). For more recent details on the connections between some known *Gymnogongrus* spp. and crustose life-history stages often hitherto called *Erythrodermis* see Decew & West (1977), Candia & Kim (1977), and Ardré (1978).

Gymnogongrus capensis (C. Agardh) J. Agardh
See the notes to *Gymnogongrus complicatus* (Kützing) Papenfuss.

Gymnogongrus complicatus (Kützing) Papenfuss
Namibia (36B; 348; 522; 522A).

Note. Also well known from South Africa (Papenfuss, 1943; Seagrief, 570); see the latter reference for suggested synonymy, which includes *Gymnogongrus capensis* (C. Agardh) J. Agardh.

Gymnogongrus corymbosus J. Agardh
Namibia (36B).

Note. Wynne (36B: 314) has recorded cystocarpic material under this name from the drift near Swakopmund. Primarily a South African seaweed, the species has been placed in the synonymy of *Gymnogongrus glomeratus* J. Agardh by Seagrief (570: 33); the latter species was also recorded attached by Wynne (36B: 315). See the entry for *G. glomeratus*.

Gymnogongrus crenulatus (Turner) J. Agardh
Canaries (214; 227).
Cape Verde Islands (598).
Mauritanie (349).
'British Isles to Mauretania' (172).
'Subtropical Africa [Senegal (N. of Gambia); Mauritania; former W. Sahara]' (598).
[As *Gymnogongrus norvegicus* (Gunnerus) J. Agardh]
Cape Verde Islands (191; 252; 408; 423).
Mauritanie (252; 500).
'Atlantique (de la Norvège à la Mauritanie)' (33).
'Atlantique nord: des côtes anglaises jusqu'au cap Blanc (Mauritanie)' (222).
[As *Gymnogongrus norvegicus* J. Agardh]
Cape Verde Islands (38).

[As *Sphaerococcus norvegicus* (Gunnerus) C. Agardh]
'In mari Atlantico, ab oris Angliae usque ad caput bonae spei' (19).

Note. Feldmann (191: 426) noted that the determination of this species from the Cape Verde Islands 'mériterait-elle confirmation'; subsequent records seem to have effected that confirmation. Comments on the biology, including life-histories, of this entity are presented in many recent studies, including Gayral (222: 455) and Ardré (1978).

Gymnogongrus devoniensis (Greville) Schotter
Cape Verde Islands (598).

Note. Schotter et al. (514) considered plants otherwise attributable to *Gymnogongrus crenulatus* (Turner) J. Agardh, but possessing internal cystocarps, to be a separate species – *G. devoniensis*. Dixon & Irvine (172: 219) indicated such plants to be rare 'found only in Cornwall, Devon, Galway, Mayo, Down and France.' The present record is a considerable extension and probably indicates a widespread range for such occasional forms, whether or not one accepts their species status.

Gymnogongrus dilatatus (Turner) J. Agardh
Namibia (36B; 162; 348; 453; 522; 522A; 523).

Note. This taxon is better known from South Africa, its currently accepted distribution having been described (523) as 'Luderitz to False Bay'. Previous Lüderitzbucht and Swakopmund records are repeated in more recent draft texts (e.g. 348) since additional records have not been established, save from the drift (36B).

Gymnogongrus glomeratus J. Agardh
Namibia (36B; 162; 298; 312A; 348; 437; 438; 522; 522A).

Note. Also well-known from the western coastline of South Africa, the concept includes *Gymnogongrus corymbosus* J. Agardh (q.v.). The earliest record in the sequence above is that of Dinter (162) in 1922, in turn supposedly based partly on an earlier one in Pilger (453), in 1908. No such record is actually presented by Pilger, who reported only *Gymnogongrus dilatatus* (Turner) J. Agardh (q.v.).

Gymnogongrus griffithsiae (Turner) Martius
Canaries (38B; 38D; 70; 108; 188; 191; 227; 229; 252; 254; 306; 375; 379; 392; 517; 546; 598).
Mauritanie (38B; 38D; 252; 350; 500; 586).
Salvage Islands (38B; 38D; 231; 375; 598).
Sierra Leone (30).
'Atlantico (de Inglaterra a Canarias . . .)' (517).
'Atlantique (de l'Angleterre aux Canaries . . .)' (33).
'Atlantique, de l'Angleterre aux Canaries . . .)' (140).
'Atlantique nord (de l'Angleterre aux Canaries . . .)' (189).
'British Isles to Mauretania and Canary Isles' (172).
'de l'Angleterre aux Canaries' (514).
'English coast southwards to the Canary Islands' (70).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
[As *Gymnogongrus Griffithsiae* Martius]
'D'Angleterre aux Canaries' (89).
[As *Gigartina griffithsiae* (Turner) Lamouroux]
Canaries (401).
[As *Gigartina griffithsiae* Lamouroux]
Canaries (44).
[As *F[ucus] Griffithsiae* Turner]
Ghana (271; ?350; ?586).

Note. The locational data for the Ghana record were presented as 'Danish Guinea'. Both the more recent treatments of that record were quite rightly expressing doubt as to the modern translation of the record; confirmation of both location and determination may be impossible since at least part of the Isert collection was burnt in 1807. A degree of doubt seems to apply to many records named as this species – that for Sierra Leone in Aleem (30), for example, is questioned by Lawson & John (350; 586), whilst the material available to Audiffred & Weisscher (38B) for the Salvage Islands was only determinable with reservation, since basal fragments of the thallus were all that was discovered. The species is clearly not well-represented nor frequent in the southern part of its range around the Canaries, Salvage Islands, and Madeira; many of the records from there are of small, sterile specimens.

Gymnogongrus intermedius Kylin
Côte d'Ivoire (?288; 350; 586).
Nigeria (213; 288; 350; 586).
'in warm temperate and tropical parts of the eastern Atlantic Ocean.' (350; 586).
'Tropical Africa (N. Gambia – Congo river)'. (598).
Note. Also well-known from South Africa (Seagrief, 570).

Gymnogongrus nigricans P. Dangeard
Angola (352).
Benin (288; 293; 350; 586).
Bioko (346; 350; 586).
Cameroun (269; 288; 292; 337; 350; 537; 586).
Côte d'Ivoire (288; 350; 586).
Ghana (288; 292; 350; 586).
Liberia (?129; 288; 350; 586).
Sõo Tomé (93; 586).
Sénégal (122; 292; 529).
'in warm temperate and tropical parts of the eastern Atlantic Ocean' (350; 586).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Tropical Africa (N. Gambia – Congo river)' (598).
[As *Gymnogongrus* sp.]
Cameroun (484).
Note. In common with other species in this morphologically 'plastic' genus, there is considerable form variation according to the environment; many of the references above (e.g. 350; 586) emphasise that. Some of the doubts so raised (e.g., those in 288 for Côte d'Ivoire material) have now been eliminated (cf. 350; 586), but others (e.g. those from Liberia in 129) remain, resulting in tentative determinations.

Gymnogongrus norvegicus (Gunnerus) J. Agardh
See *Gymnogongrus crenulatus* (Turner) J. Agardh.

Gymnogongrus patens J. Agardh
Canaries (229).
'Atlantique nord: des côtes anglaises jusqu'au cap Blanc (Mauritanie)' (222).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
[As *Gymnogongrus patens* (Gooden. et Woodw.) J. Agardh]
Mauritanie (349).
Western Sahara (349).
Note. Dangeard on two occasions (117; 118) stated this taxon to be absent from the Canary Islands. However, the recent (229) record in Gil-Rodriguez & Wildpret de la Torre (1980) has refuted that. See Dixon & Irvine (172: 217) on the status of species and its assignment to *Gymnogongrus*.

Gymnogongrus tenuis (J. Agardh) J. Agardh
Angola (352).
Côte d'Ivoire (288; 350; 586).
Gambia (288; 296; 350; 586).
Guinea-Bissau (529).
Liberia (129; 288; 350; 586).
Nigeria (213; 288; 350; 586).
Sénégal (55; 59; 122; 213; 529).
'Atlantique tropicale' (529).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
'Tropical Africa (N. Gambia – Congo river)' (598).
'widespread in warm temperate and tropical seas' (350; 586).
Note. The specific epithet in (55) is rendered as '*tennis*' in error. Elsewhere (e.g. 529), the authorities are often inaccurately presented as simply 'J. Agardh'. See also the notes to the entry for *Gymnogongrus* spp.

Gymnogongrus vermicularis (C. Agardh) J. Agardh
Namibia (348; 522; 522A).

Note. This species is well-known from South Africa (Seagrief, 570) and appears at many accessible appropriate locations along the Namibia coastline, cited in the above references. See also comments in the entry for *Chondrus elongatus* Montagne.

Gymnogongrus spp.
Benin (293).
Cape Verde Islands (?445; ?446).
Côte d'Ivoire (287; 288).
Gabon (250).
Ghana (344).
Guinea-Bissau (529).
Liberia (129; 287; 288).
Namibia (348; 522).

Note. Reservations that commonly attach to such limited records are again apparent here. The doubt expressed for Cape Verde Islands records in Piccone (445; 446) relates directly to generic attribution. Plants noted by John (288) in Côte d'Ivoire were of at least two contrasting morphologies, the larger being perhaps no more than a form of *Gymnogongrus tenuis* (J. Agardh) J. Agardh (q.v.), widely known in the Gulf of Guinea region. Materials of most collections (e.g. that from Gabon) were of difficult sterile specimens, usually detected in very small amounts (e.g. those from Liberia in 129). Material from Namibian localities reported by Simons (522) was repeated without comment in 348.

Gymnophlaea canariensis Kützing
Canaries (24; 318; 324).
[As *Halymenia capensis* Montagne]
Canaries (44; 401; 403).

Note. The attribution of these records is not clear. In the original description, Kützing (318: 712) gave as synonymy:

> '*Halymenia capensis* Mont. Canar. p. 164 (excl. Syn. Ag.) *Gigartina dichotoma* Despr. (sec. Mont.) . . . In mari Canariensi . . . Spec. dedit cl. Montagne.'

The reference to Montagne (401: 164) concerns the original description, including as synonymy both *Gigartina dichotoma* of Despreaux and *Halymenia furcellata* var. *capensis*? Ag. *Sp. alg. I.* p. 214, of *Halymenia capensis* (q.v.).

Records of the latter taxon from the Cape, as opposed to those from the Canaries dealt with here, were synonymised later (p. 738) in Kützing (318) with *Chondrus capensis* (Montagne) Kützing; this is a change from the treatment earlier (Kützing, 317: 25), where *Halymenia capensis* of Montagne was directly the source of *Gymnophlaea capensis* Kützing.

A Canaries specimen of apparently the same species, whatever name should be correctly applied, was collected by Broussonnet and given by Bouchet of Montpellier to P. B.-Webb; it was given the name *Ceramium fucoides* by Broussonnet.

Gymnothamnion elegans (Schousboe ex C. Agardh) J. Agardh
[As *Gymnothamnion elegans* (Schousboe) J. Agardh]
Ascension (475).
Canaries (13; 33; 191; 227; 375; 584; 598).
Sénégal (529).
'Atlantique (de la côte Basque aux Canaries . . .)' (33; 190; 196).
'Pantropical' (529).
'Subtropical Africa [Senegal (N. of Gambia), Mauritania, Former W. Sahara]' (598).
[As *Gymnothamnion elegans* (Schousboe in C. Agardh) J. Agardh]
Canaries (108).
Sénégal (529).
[As *Gymnothamnion elegans* J. Agardh]
Canaries (191).
[As *Plumaria schousboei* (Bornet) Schmitz]
Canaries (39; 71; 489; 490).
'Nordwestafrikanische Küste' (499).

Note. This taxon, despite the difficulties of being certain as to identification when only vegetative

material is available, is in all probability more widespread in the area than the current recording pattern would suggest. Close scrutiny of all potential hosts collected is normally required to locate specimens. Available data from outside the list area suggest that generalised statements indicating a pantropical Atlantic distribution are probably correct – Levring (375), for example, indicated records for Madeira, Bermuda, and the West Indies.

Acknowledgements

We acknowledge with many thanks the assistance received from many sources. The principal benefactors are (i) British Museum (Natural History), Department of Botany, for provision of the necessary research facilities during construction of the series of papers that includes the present part; (ii) Mr J. R. Laundon for editorial expertise; (iii) Ms Sandra Davie, who willingly and promptly typed the original version of a somewhat concentrated manuscript; (iv) Dr W. F. Prud'homme-van Reine and Mr R. H. Simons, who provided hitherto unpublished data from expeditions, respectively to CANCAP (Canaries and Cape Verde Islands) and Namibia.

References

This single list results from the application of three major criteria:

1. The basis is the list previously published in 1986 (Price et al., Florideae 1 (Genera A–F), this series). Numbers used there for references remain in general unchanged if the same reference also appears here. The only case of change is the introduction of a number for a reference that (a) was previously relevant only through appropriate taxonomic comment and lacked records for any Florideae 1 taxa, but (b) *does* contain records that are relevant to taxa in the present part. The reverse is also true – a number is dropped (although it will be reapplied as required in subsequent parts) if a reference is here only included for taxonomic reasons.

2. References previously included are omitted here if they are not relevant for either taxonomic purposes or through provision of records.

3. Publications of relevance that have been either first detected or actually published in the time since Florideae 1 (i.e., since 30/10/86) are included here for the first time. In many cases, they require a number because of the presence of appropriate records. Numbers allocated lie in the sequence from 567 onwards, the point at which bulk allocation in the 1986 list ceased.

Since the list is arranged overall alphabetically on authors' surnames, the application of the above criteria produces numerical irregularity, which has been overcome by insertion at the appropriate point of a numerical cross-reference. The reference system is therefore approachable with facility from various directions – with startpoints in biogeography, in taxonomy, or simply through appropriate authors.

585. **Abbott, I. A.** 1962. Some *Liagora*-inhabiting species of *Acrochaetium*. *Occ. Pap. Bernice P. Bishop Mus.* **23**: 77–120.

—— 1983. Some species of *Gracilaria* (Rhodophyta) from California. *Taxon* **32**: 561–564.

1. —— 1984*a*. Two new species of *Liagora* (Nemaliales, Rhodophyta) and notes on *Liagora farinosa* Lamouroux. *Am. J. Bot.* **71**: 1015–1022.

1A. —— **& Hollenberg, G. J.** 1976. *Marine algae of California*. Stanford, California.

——**& Norris, J. N.** 1985. *Taxonomy of economic seaweeds With reference to some Pacific and Caribbean species*. La Jolla, California.

2. **Acunã González, A.** 1970. Algunos aspectos de la vegetación submarina de las Islas Canarias. *Vieraea* [**1**]: 2–5.

3. —— 1972. Observaciones ecológicas sobre las algas de la zona litoral de Las Galletas, Tenerife. *Vieraea* **2**(1): 2–9.

4. —— 1972? ['1968–1970']. Cinco nuevas citas de algas Rhodophyceae en la Isla de Tenerife. *An. Univ. La Laguna* **7**: 3–6.

5. —— **Santos G[uerra], A. & Wildpret [de la Torre], W.** 1970. Algunos aspectos de la vegetación algal de la Playa de San Marcos, Icod, Tenerife. *Cuad. Bot. canaria* **9**: 30–36.

8. **Afonso-Carrillo, J.** 1980*a*. Algunas observaciones sobre la distribución vertical de las algas en la Isla del Hierro (Canarias). *Vieraea* **10**(1–2): 3–16.

576. —— 1985. Conexiones intercelulares entre diferentes talos de *Neogoniolithon absimile* (Foslie et Howe) Cabioch (Corallinaceae, Rhodophyta). *Vieraea* **15**: 139–142.

13. —— **& Gil-Rodriguez, M. C.** 1980*b*. Datos para la flora marina de la Isla de Fuerteventura. *Vieraea* **10**(1–2): 147–170.

14. —— —— 1981. Sobre el limite meridional de *Sauvageaugloia chordariaeformis* (Crouan) Kylin (Chordariaceae, Phaeophyta). *Investigacion pesq.* **45**: 297–300.

16. —— —— **& Wildpret de la Torre, W.** 1979 ['1978']. Estudio de la vegetación algal de la costa del futuro polígono industrial de Granadilla (Tenerife). *Vieraea* **8**(1): 201–242.

582. **Afonso-Carrillo, J., Gil-Rodriguez, M. C. & Wildpret de la Torre, W.** 1985 ['1984']. Algunas consideraciones floristicas, corologicas y ecologicas sobre las algas Corallinaceae (Rhodophyta) de las Islas Canarias. *An. Biol., Univ. Murcia* **2** (Secc. Esp. 2): 23–37.

18. —— —— **Haroun Tabraue, R., Villena Balsa, M. & Wildpret de la Torre, W.** 1984 ['1983']. Adiciones y correcciones al catalogo de algas marinas bentonicas para el Archipielago Canario. *Vieraea* **13**: 27–49.

19. **Agardh, C. A.** 1822. *Species algarum rite cognitae . . .* **1** (2). Lund.
Note. There is another version of this first volume beside that issued at Lund. The parts issued at Griefswald were dated 1821 [part 1] and 1823 [part 2] and had title-pages different to those of the Lund issues.

21. —— 1828. *Species algarum rite cognitae . . .* **2**(1). Gryphiae.

24. **Agardh, J. G.** 1851. *Species genera et ordines algarum, . . . floridearum, . . .* **2**(1). Lund.
Note. Facsimile reprint, J. Cramer, 1977.

25. —— 1852. *Species genera et ordines algarum, . . . floridearum, . . .* **2**(2). Lundae.
Notes. 1. The Corallineae (Ordo XII. pp. 506–576) was by J. E. Areschoug – so stated in volume. 2. Some versions of this second volume, Pars II, were issued as two separate texts – Pars II: 1 being dated 1851 and Pars II: 2, 1852. 3. There are also internal differences of numbering of pages between copies. BMNH copy is numbered straight through from 337–720, including therein the Addenda [701–706] and Index [707–720]. In the copy from which the Cramer (1977) reprint was prepared, the Index [unnumbered, of 14 sides] is placed immediately after p. 700 and is followed by six sides [also unnumbered] of Addenda. Content of these unnumbered sides is exactly as the numbered BMNH pages. The BMNH copy of Vol. 2 Part 3 (1863) commences with pages headed 'Ordo XIV. Wrangelieae', and numbered 701–715; these are followed by 'Ordo XV. Chondrieae' [pp. 716–786]. All these latter pages [701–786], also so numbered, are in the Cramer (1977) version placed immediately after the unnumbered Addenda pages (see above) and before the title page to Vol. 2, Part 3, of 1863, thereby implying that the copy facsimiled was also so arranged. Pages from 787 to 1291 are in both cases in Vol. 2, Part 3, 1863. Despite this, the Index in the end of the Cramer (1977) facsimile of Vol. 2, Part 3 (pp. 1279–1291) indicates the same page numbers as does the BMNH version. Both dated texts are indicated as the sources of data where the records occur in pp. 701–786 [textual pages]. The implication behind all this is that there may be yet other differently paged versions elsewhere.

27. —— 1876. *Species genera et ordines algarum . . .* **3***: De Florideis curae posteriores.* Part 1. *Epicrisis systematis floridearum.* Lipsiae.

Akatsuka, I. 1986. Surface cell morphology and its relationship to other generic characters in non-parasitic Gelidaceae (Rhodophyta). *Botanica mar.* **29**: 59–68.

30. **Aleem, A. A.** 1978. A preliminary list of marine algae from Sierra Leone. *Botanica mar.* **21**: 397–399.

31. —— 1980*a*. Marine Cyanophyta from Sierra Leone (West Africa). *Botanica mar.* **23**: 49–51.

33. **Ardré, F.** 1970 ['1969–70']. Contribution à l'étude des algues marines du Portugal I – La Flore. *Port. Acta biol.* B, **10**: 137–555 + [56].
Note. The reprint is paged 1–423 + [56].

—— 1978. Sur les cycles morphologiques du *Gymnogongrus crenulatus* (Turner) J. Ag. et du *Gymnogongrus devoniensis* (Grev.) Schott. (Gigartinales, Phyllophoracées). *Revue algol.* **13**: 151–176.

588. —— **& Gayral, P.** 1961. Quelques *Grateloupia* de l'Atlantique et du Pacifique. *Revue algol.* **6**: 38–48.

36B. See **Wynne, M. J.** 1986.

37. **Askenasy, E.** 1888 ['1889']. Algen, mit Unterstützung der Herren E. Bornet, A. Grunow, P. Hariot, M. Moebius, O. Nordstedt bearbeitet. *In* A. Engler, *Die Forschungsreise S.M.S. 'Gazelle' in den Jahren 1874 bis 1876 unter Kommando des Kapitän zur See Freiherrn von Schleinitz herausgegeben von dem Hydrographischen Amt des Reichs-Marine-Amts.* IV. Theil. *Botanik* 1–58. Berlin.
Note. Publication of the algal section was definitely originally in 1888, since it was noted in *Nat. Novid., Berlin*, No. 21, October 1888, p. 328. The overall title page for Theil IV was issued 1889 and since the whole Theil seems also to have been issued in soft covers (also dated 1889), the algal portion was probably reissued on that date.

38. —— 1897. Enumération des algues des îles du Cap Vert. *Bolm Soc. broteriana* **13**: 150–175.
Note. For date of publication, see Silva (1960). Reprints of this work are believed to be repaged 1–25.

38B. **Audiffred, P. A. J. & Weisscher, F. L. M.** 1984. Marine algae of Selvagem Grande (Salvage Islands, Macaronesia). *Bolm Mus. munic. Funchal* **36**: 5–37.

38C. —— 1985 ['1984']. Marine algae of El Hierro (Canary Islands). *Vieraea* **14**: 157–183.

38D. —— **& Prud'homme van Reine, W. F.** 1985. Marine algae of Ilha do Porto Santo and Deserta Grande (Madeira Archipelago). *Bolm Mus. munic. Funchal* **37**: 20–51.

39. **Baardseth, E.** 1941. *The marine algae of Tristan da Cunha.* Results of the Norwegian Scientific Expedition to Tristan da Cunha 1937–1938. No. 9. Oslo.

596. **Bailey, J. W. & Harvey, W. H.** 1862. Algae [pp. 153–192, pls. I–IX]. *In* Anon., *United States Exploring Expedition. During the years 1838–1842, under the command of Charles Wilkes, U.S.N.* Vol. **XVII**. *Botany.* I. *Lower Cryptogamia.* Philadelphia.

Baldock, R. N. 1976. The Griffithsiae group of the Ceramiaceae (Rhodophyta) and its southern Australian representatives. *Aust. J. Bot.* **24**: 509–593.

Barton, E. S. 1893. A provisional list of the marine algae of the Cape of Good Hope. *J. Bot., Lond.* **31**: 171–177.

41. —— 1897. Welwitsch's African marine algae. *J. Bot., Lond.* **35**: 369–374.

42. —— 1901. Marine algae. *In* Anon. [W. P. Hiern?], *Catalogue of the African plants collected by Dr. Friedrich Welwitsch in 1853–61.* **2**(2) *Cryptogamia*: 324–328. London.

42A. **Bassindale, R.** 1961. On the marine fauna of Ghana. *Proc. zool. Soc. Lond.* **137**: 481–510.

44. **Benítez, A. J.** 1928(?). *Historia de las Islas Canarias* (Edición ilustrada), [vol. I]. Santa Cruz de Tenerife.

Note. The work does not appear to be dated but the BMNH copy was received 3 July 1928 and 1928 has been impressed on the spine. The flora, entitled 'Fitografía Canaria . . .' and appearing on pp. 137–144, appears simply to be a list of plant names taken from Montagne (401) in Barker-Webb & Berthelot (q.v.). The reference to 'vol. I' indicates simply that only the first 528 of a total of more than 1000 pages were published.

Bird, C. J. & McLachlan, J. 1982*a*. A consideration of taxonomic problems in some species of *Gracilaria*. *In* Anon., *Scientific programme and abstracts*: a 4. First International Phycological Congress, St. John's, Newfoundland, Canada, August 8th–14th, 1982. St. John's.

45. ———— 1982*b*. Some underutilized taxonomic criteria in *Gracilaria* (Rhodophyta, Gigartinales). *Botanica mar.* **25**: 557–562.

46. ———— 1983. Taxonomy of *Gracilaria*: reproductive structures and attempted hybridizations [p. 16]. *In* Anon., Abstracts XIth International Seaweed Symposium 19–25 June 1983, Qingdao, China. Qingdao.

———— 1984. Taxonomy of *Gracilaria*: evaluation of some aspects of reproductive structure. *In* I. A. Abbott (Ed.), Taxonomy of *Gracilaria* . . .: 41–46. *In* H. J. Dumont, . . . C. J. Bird & M. A. Ragan (Eds). XIth International Seaweed Symposium held in Qingdao, People's Republic of China, June 19–25, 1983. *Hydrobiologia* **116/117**: XXXI + [1] + 1–624.

Note. Overall Proceedings also separately reprinted as *Developments in Hydrobiology* **22**.

592. **Bird, C. J. & Oliveira filho, E. C. de** 1986. *Gracilaria tenuifrons* sp. nov. (Gigartinales, Rhodophyta), a species from the tropical western Atlantic with superficial spermatangia. *Phycologia* **25**: 313–320.

Bird, C. J., van der Meer, J. P. & McLachlan, J. 1982. A comment on *Gracilaria verrucosa* (Huds.) Papenf. (Rhodophyta, Gigartinales). *J. mar. biol. Ass. U.K.* **62**: 453–459.

47. **Bodard, M.** 1965*a*. *Grateloupia senegalensis*, nouvelle espèce de l'Ouest africain (Rhodophytes, Cryptonémiales). *Bull. Inst. fond. Afr. noire* A, **27**: 1211–1220.

48. —— 1965*b* ['1964']. Le *Gracilaria occidentalis* (Borg.): une espèce de Rhodophycée pantropicale Atlantique. *Bull. Mus. natn. Hist. nat. Paris* II, **36**: 874–878.

50. —— 1966*b*. Première liste des espèces d'algues présentes sur la Pointe de Sarène (Sénégal). *Notes afr.* **111**: 81–89.

51. —— 1967*a*. Sur le développement des cystocarpes des *Gracilaria et Gracilariopsis* au Sénégal. *Bull. Inst. fond. Afr. noire* A, **29**: 869–903.

52. —— 1967*b* ['1966']. Les *Gracilaria* et *Gracilariopsis* au Sénégal. *Annls Fac. Sci. Univ. Dakar* **19**: 27–55.

53. ——1968*a*. Les *Hypnea* au Sénégal [Hypnéacées, Gigartinales]. *Bull. Inst. fond. Afr. noire* A, **30**: 811–829.

55. —— 1971*a*. *Halymenia senegalensis*, nov. sp. [Algae], espèce caractéristique de l'infralittoral sénégalais. *Bull. Inst. fond. Afr. noire* A, **33**: 1–19.

56. —— 1971*b*. Sur un genre nouveau de Delesseriacées: *Pseudobranchioglossum senegalense*, algue de l'infralittoral sénégalais. *Bull. Inst. fond. Afr. noire* A, **33**: 20–31.

57. —— 1971*c*. Étude morphologique et cytologique d'*Helminthocladia senegalensis* (Rhodo-

phycées), Nemalionale nouvelle à carpotétraspores et à cycle haplodiplophasique. *Phycologia* **10**: 361–374.

59. —— **& Mollion, J.** 1974. La végétation infralittorale de la petite côte sénégalaise. *Bull. Soc. phycol. Fr.* **19**: 193–221.

60. **Børgesen, F.** 1916. The marine algae of the Danish West Indies Vol. 2. Rhodophyceae [pt. 2]. *Dansk bot. Ark.* **3**(1b): 81–144.
Note. Reprints paginated in exactly the same way.

63. —— 1919. The marine algae of the Danish West Indies Vol. 2. Rhodophyceae [pt. 5]. *Dansk bot. Ark.* **3**(1e): 305–368.

64. —— 1920. The marine algae of the Danish West Indies Vol. 2. Rhodophyceae [pt. 6]. With Addenda to the Chlorophyceae, Phaeophyceae and Rhodophyceae. *Dansk bot. Ark.* **3**(1f): 369–504.

66. —— 1925. Marine algae from the Canary Islands especially from Teneriffe and Gran Canaria I. Chlorophyceae. *Biol. Meddr* **5**(3): 1–123.

68. —— 1927. Marine algae from the Canary Islands especially from Teneriffe and Gran Canaria III. Rhodophyceae Part I Bangiales and Nemalionales. *Biol. Meddr* **6**(6): 1–97.

70. —— 1929. Marine algae from the Canary Islands especially from Teneriffe and Gran Canaria III. Rhodophyceae Part II Cryptonemiales, Gigartinales and Rhodymeniales. Les Mélobésiées by (par) Mme Paul Lemoine. *Biol. Meddr* **8**(1): 1–97 + [9].

71. —— 1930. Marine algae from the Canary Islands especially from Teneriffe and Gran Canaria III. Rhodophyceae Part III Ceramiales. *Biol. Meddr* **9**(1): 1–159.

72. —— 1931. Some Indian Rhodophyceae especially from the shores of the Presidency of Bombay. *Bull. misc. Inf. R. bot. Gdns, Kew* **1931** (1): 1–24.

73. —— 1932. Some Indian green and brown algae especially from the shores of the Presidency of Bombay – II. *J. Indian bot. Soc.* **11**(1): 51–70.

74. —— 1934. Some marine algae from the northern part of the Arabian Sea with remarks on their geographical distribution. *Biol. Meddr* **11**(6): 1–72.

78. —— 1939. Marine algae from the Iranian Gulf especially from the innermost part near Bushire and the Island Kharg. *Dan. scient. Invest. Iran* **1**: 1–141.

80. —— 1942. Some marine algae from Mauritius. III. Rhodophyceae Part I Porphyridiales, Bangiales Nemalionales. *Biol. Meddr* **17**(5): 1–64.

81. —— 1943. Some marine algae from Mauritius III. Rhodophyceae Part 2 Gelidiales, Cryptonemiales, Gigartinales. *Biol. Meddr* **19**(1): 1–85.

89. **Bornet, É.** 1892. Les algues de P.-K.-A. Schousboe. *Mém. Soc. natn. Sci. nat. Math. Cherbourg* **28**: 165–376.
Note. Also published as a separate, with new prefatory pages, dated 1892, and bearing two sets of pagination – the original as in the journal and a repagination from p. 1 to 216. Because of the prefatory pages, the original p. 165 becomes p. 5. Published Paris: Librairie G. Masson.

90. **Bory de St-Vincent, J. B. G. M.** 1803. *Essais sur les Isles Fortunées et l'antique Atlantide, ou précis de l'histoire générale de l'Archipel des Canaries.* Paris.
Note. 'Germinal An XI' has been converted from the calendar of the Republique.

Boudouresque, C.-F., Perret-Boudouresque, M. & Knoepffler-Péguy, M. 1984. Inventaire des algues marines benthiques dans les Pyrénées-Orientales (Mediterranéee[sic!], France). *Vie Milieu* **34**: 41–59.

92. **Buchanan, J. B.** 1958. The bottom fauna communities across the continental shelf off Accra, Ghana (Gold Coast). *Proc. zool. Soc. Lond.* **130**: 1–56.

Cabioch, J. 1972. Étude sur les Corallinacées. II. La morphogènese; conséquences systématiques et phylogénétiques. *Cah. Biol. mar.* **13**: 137–288.

Candia, A. I. & Kim, D. H. 1977. Resultados preliminares de los estudios de ciclo de vida de *Gymnogongrus furcellatus* (C. Agardh) J. Agardh (Phyllophoraceae, Gigartinales). *Gayana* (Miscellanea) **5**: 77–78.

581. **Cardell Cristellys, E., Calvo Esteban, M. & Lecuona Fernandez, C.** 1977. Curvas anuales del contenido en Agar-agar y aislamiento del D-manitol en dos algas de Las Islas Canarias: *Gelidium arbuscula* Bory y *Gelidium cartilagineum* (L.) Gaill. var. *canariensis* Grun. *Anal. Inst. Bot. Cavanilles* **34**: 303–308.

93. **Carpine, C.** 1959. Aperçu sur les peuplements littoraux. *Annls Inst. océanogr., Monaco* **37**: 75–90.

579. **Carter, A. R. & Anderson, R. J.** 1986. Seasonal growth and agar contents in *Gelidium pristoides* (Gelidiales, Rhodophyta) from Port Alfred, South Africa. *Botanica mar.* **29**: 117–123.

572. **Chang, C. F. & Xia, B. M.** 1963. *Polycavernosa*, a new genus of the Gracilariaceae. *Stud. Mar. Sinica* **3**: 119–126.

97. **Chapman, V. J.** 1963. The marine algae of Jamaica Part 2. Phaeophyceae and Rhodophyceae. *Bull. Inst. Jamaica, Sci. Ser.* **12**(2): 1–195.

99. **Chevalier, A.** 1920. *Exploration botanique de l'Afrique occidentale Française.* **I.** *Enumération des plantes récoltées avec une carte botanique, agricole et forestière.* Paris.
Note. The algae (pp. 785–788) are acknowledged as being determined by P. Hariot.

100. —— 1935. Les Iles du Cap Vert. Géographie, biogéographie, agriculture Flore de l'Archipel. *Revue Bot. appl. Agric. trop.* **15**: 733–1090.
Note. A separate exists, bearing old pagination at top but repaged at bottom [2] + 1–358 + [1]. See also no. 183.

103. **Chou, R. C.-Y.** 1945 ['1944']. Pacific species of *Galaxaura* I. Asexual types. *Pap. Mich. Acad. Sci.* **30**: 35–56.

104. —— 1947 ['1945']. Pacific species of *Galaxaura* II. Sexual types. *Pap. Mich. Acad. Sci.* **31**: 3–24.

108. **Cordeiro-Marino, M.** 1978. Rodofíceas bentônicas marinhas do Estado de Santa Catarina. *Rickia* **7**: [6] + 1–243, 1977.

109. **Cotton, A. D.** 1912. Clare Island survey part 15 Marine algae. *Proc. R. Ir. Acad.* B, **31**: 1–178.

113. **Cribb, A. B.** 1983. *Marine algae of the southern Great Barrier Reef Part I Rhodophyta.* Australian Coral Reef Society (incorporating The Great Barrier Reef Committee) Handbook No. 2. Place of publication not given [presumably Brisbane].

117. **Dangeard, P.** 1948. Sur la flore des algues marines du Maroc Occidental. *C. r. hebd. Séanc. Acad. Sci., Paris* **227**: 364–365.

118. —— 1949*a*. Les algues marines de la côte occidentale du Maroc. *Botaniste* **34**: 89–189.

120. —— 1951*a*. Deux espèces nouvelles du genre *Chondria* de la région de Dakar. *Botaniste* **35**: 13–19.

121. —— 1951*b*. Sur les Gélidiacées de Dakar et de Port-Etienne. *Botaniste* **35**: 21–25.

122. —— 1952. Algues de la presqu'ile du Cap Vert (Dakar) et de ses environs. *Botaniste* **36**: 193–329.

123. —— 1958. Notice sur les travaux scientifiques (1931–1956) de M. Pierre Dangeard, . . . *Botaniste* **42**, Supplément: [2] + 1–98 + [4].

Dawson, E. Y., Acleto, C. & Foldvik, N. 1964. The seaweeds of Peru. *Beih. nov. Hedwigia* **13**: [8] + 1–111.

Dawson, E. Y. 1949. Studies on northeast Pacific Gracilariaceae. *Allan Hancock Foundn Publ., occ. Pap.* **7**: 1–54.

126. **Decaisne, J.** 1842*a*. Mémoire sur les Corallines ou Polypiers calcifères. *Annls Sci. nat.* (Bot.) II, **18**: 96–128.
Note. See note accompanying entry 127.

127. —— 1842*b*. Essai sur une classification des algues et des polypiers calcifères [pp. 1–84]. [and] Mémoire sur les Corallines [pp. 85–116]. *In* Anon., *Académie de Paris. Faculté des Sciences. . . . Thèses présentées et soutenues à la Faculté des Sciences de Paris Le 19 Décembre 1842.*
Note. Repaged from papers by Decaisne in *Annls Sci. nat.* (Bot.) II, **17**: 297–380, 1842 and *Annls Sci. nat.* (Bot.) II, **18**: 96–128, 1842 [entry 126]. Plates associated with the first of these thèses, like those in the original paper, bear erroneously the volume number **16** despite being published in volume **17**.

Decew, T. & West, J. A. 1977. Life history relationship between *Gymnogongrus leptophyllus* and *Erythrodermis (= Petrocelis) haematis. Br. phycol. J.* **12**: 118.

128A. **Delgado E., Gonzalez, M. N. & Jorge, D.** 1986 ['1984']. Contribucion al estudio de la vegetacion ficologica de la zona de Arinaga (Gran Canaria). *Botanica Macaronésica* **12–13**: 97–110.

129. **De May, D., John, D. M. & Lawson, G. W.** 1977. A contribution to the littoral ecology of Liberia. *Botanica mar.* **20**: 41–46.

131. **De Toni, G. B.** 1897. *Sylloge algarum omnium hucusque cognitarum . . .* **4.** *Sylloge Floridearum . . .* Sectio I. – Familiae I–XI. Patavii.

132. ——1900. *Sylloge algarum omnium hucusque cognitarum . . .* **4.** *Sylloge Floridearum . . .* Sectio II – Familiae I–IV. Patavii.

133. —— 1903. *Sylloge algarum omnium hucusque cognitarum . . .* **4.** *Sylloge Floridearum . . .* Sectio III – Familiae V–VI. Patavii.

134. —— 1905. *Sylloge algarum omnium hucusque cognitarum . . .* **4.** *Sylloge Floridearum . . .* Sectio IV – Familiae I–VII. Patavii.

137. —— 1909*b*. Hariot, P. – Les algues de San Thomé (côte occidentale d'Afrique. – Journal de Botanique XXI, 1908, n. 7, pag. 161–164, I fig.). *Nuova Notarisia* **20** [= **24** from *Notarisia* start]: 59.

139. —— 1924. *Sylloge algarum omnium hucusque cognitarum . . .* **6.** *Sylloge Floridearum . . .* Sectio V. *Additamenta.* Patavii.

140. —— **& Forti, A.** 1913. Contribution à la flore algologique de la Tripolitaine et de la Cyrénaïque. *Annls Inst. océanogr., Monaco* **5**(7): 1–56.

141A. —— **& Levi, D.** 1888. *L'algarium Zanardini.* Venezia.
142. **Dickie, G.** 1872. On the marine algae of the island of St. Helena. *J. Linn. Soc.* (Bot.) **13**: 178–182.
145. —— 1874*c*. Enumeration of algae collected at the Cape-Verde Islands by H. N. Moseley, M. A., Naturalist to H.M.S. 'Challenger'. *J. Linn. Soc.* (Bot.) **14**: 344–349.
152. **Dickinson, C. I.** 1952. Marine algae from the Gold Coast: IV. *Kew Bull.* **7**: 41–43.
153. —— **& Foote, V. J.** 1950. Marine algae from the Gold Coast I. *Kew Bull.* **5**: 267–272.
154. —— —— 1951. Marine algae from the Gold Coast: II. *Kew Bull.* **6**: 133–138.
161. **Dinter, K.** 1921. Index, der aus Deutsch-Südwestafrika bis zum Jahre 1917 bekannt gewordenen Pflanzenarten. IX. *Reprium Spec. nov. Regni veg.* **17**: 303–311.
162. —— 1922*a*. Index, der aus Deutsch-Südwestafrika bis zum Jahre 1917 bekannt gewordenen Pflanzenarten. X. *Reprium Spec. nov. Regni veg.* **18**: 13–16.
168. —— 1926*b*. Index der aus Deutsch-Südwestafrika bis zum Jahre 1917 bekannt gewordenen Pflanzenarten. XX. *Reprium Spec. nov. Regni veg.* **23**: 130–137.
170. **Dixon, P. S.** 1958. The occurrence of *Gelidium sesquipedale* (Clem.) Thur. in the British Isles. *Br. phycol. Bull.* **1**(6): 47–48.
—— 1967. The typification of *Fucus cartilagineus* L. and *F. corneus* Huds. *Blumea* **15**: 55–62.
—— **& De Valera, M.** 1961. A critical survey of the evidence for the occurrence of *Gelidium torulosum* Kütz. and *G. melanoideum* Schousb. ex Born. in Britain and Ireland. *Br. phycol. Bull.* **2**: 67–70.
172. —— **& Irvine, L. M.** 1977. *Seaweeds of the British Isles* Volume 1 *Rhodophyta* Part 1 *Introduction, Nemaliales, Gigartinales.* London.
173. **Dizerbo, A.-H.** 1974. La répartition des *Gigartina* (Gigartinales, Gigartinacées) du Massif Armoricain. *Bull. Soc. phycol. Fr.* **19**: 88–94.
177. **Edelstein, T.** 1964. On the sublittoral algae of the Haifa Bay area. *Vie Milieu* **15**: 177–212.
—— **Chen, L. C.-M. & McLachlan, J.** 1978. Studies on *Gracilaria* (Gigartinales, Rhodophyta): reproductive structures. *J. Phycol.* **14**: 92–100.
Ellis, J. & Solander, D. 1786. *The natural history of many curious and uncommon zoophytes, collected from various parts of the globe by the late John Ellis . . . Systematically arranged and described by the late Daniel Solander* . . . pp. xii + 208. London.
Fan, K.-C. 1961. Morphological studies of the Gelidiales. *Univ. Calif. Publns Bot.* **32**: 315–368.
575. —— **& Papenfuss, G. F.** 1959. Red algal parasites occurring on members of the Gelidiales. *Madroño* **15**: 33–38.
180. **Farnham, W. F.** 1980. Studies on aliens in the marine flora of southern England. *In* J. H. Price, D. E. G. Irvine and W. F. Farnham (Eds), *The Shore Environment* 2: *Ecosystems*: 875–914. London & New York.
182. **Feldmann, G. & Bodard, M.** 1965. Une nouvelle espèce de *Botryocladia* des côtes du Sénégal. *Bull. Inst. océanogr. Monaco* **65** (1342): 1–14.
183. **Feldmann, J.** 1935. Algues marines des Isles du Cap Vert recoltées par M. le Professeur Aug. Chevalier. *Rev. Bot. appl. Agric. trop.* **15**: 1069–1071.
Note. This is also published as a separate with the original page numbers retained at the top of each page and a new sequence (pp. 1–358) at the bottom of the page. See also no. 100.
184. —— 1937. *Recherches sur la végétation marine de la Méditerranée. La Côte des Albères.*
Note. Originally published as *Revue algol.* **10**: 1–339. Printed 28 October 1937, but published with '1938' on title-page of part. The separate form was published with '1937' on title-page and attributed inside as extracted from the *Revue algol.* Tome X, Nov. 1937. The BMNH copy of the journal was received 22 June 1938. No textural differences exist between the two versions.
188. —— 1939. Les algues marines de la Côte des Albères. IV – Rhodophycées. *Revue algol.* **11**: 247–330.
Note. Includes Bangialès, Nemalionales, Gelidiales and Cryptonemiales.
189. —— 1941. Les algues marines de la Côte des Albères. IV – Rhodophycées (suite). *Revue algol.* **12**: 77–100.
Note. Covers the Gigartinales and Rhodymeniales.
190. —— 1942. Les algues marines de la Côtes des Albères. IV. Rhodophycées (fin). *Trav. algol.* **1**: 29–113.
Note. Covers Ceramiales. *Travaux algologiques* **1** replaced volume **13** of the original series of *Revue algologique*.
191. —— 1946. La flore marine des Iles Atlantides. *Mém. Soc. Biogéogr.* **8**: 395–435.
192. —— 1951. La flore marine de l'Afrique du Nord. *C. r. somm. Séanc. Soc. Biogéogr.* **28**: 103–108.
194. —— **& Hamel, G.** 1934. Observations sur quelques Gélidiacées. *Revue gén. Bot.* **46**: 528–549.
195. —— —— 1936. Floridées de France VII. Gélidiales. *Revue algol.* **9**: 85–140.

196. **Feldmann-Mazoyer, G.** 1941. *Recherches sur les Céramiacées de la Méditerranée Occidentale.* Alger.

Foslie, M. 1898*a*. Systematical survey of the Lithothamnia. *K. nor. Vidensk. Selsk. Skr.* **1898** (2): 1–7.

198. —— 1900*b*. New or critical calcareous algae. *K. nor. Vidensk. Selsk. Skr.* **1899** (5): 1–34, 1900.

—— 1900*d*. Revised systematical survey of the Melobesieae. *K. nor. Vidensk. Selsk. Skr.* **1900** (5): 1–22.

212. —— **& Printz, H.** 1929. *Contributions to a monograph of the Lithothamnia . . . after the author's death collected and edited by Henrik Printz.* Kgl. norske Vidensk. Selsk. Museet. Trondheim.

213. **Fox, M.** 1957. A first list of marine algae from Nigeria. *J. Linn. Soc.* (Bot.) **55**: 615–631.

Fredericq, S. & Norris, J. N. 1985. Morphological studies on some tropical species of *Gracilaria* Grev. (Gracilariaceae, Rhodophyta): taxonomic concepts based on reproductive morphology [pp. 137–155]. *In* I. A. Abbott & J. N. Norris (Eds), *Taxonomy of economic seaweeds With reference to some Pacific and Caribbean species.* La Jolla, California.

214. **Frémy, P.** 1936. Marine algae from the Canary Islands especially from Teneriffe and Gran Canaria IV. Cyanophyceae. *K. dansk. Vidensk. Selsk. Skr.* **12** (5): 1–43.

215. **Gain, L.** 1914. Algues provenant des campagnes de l'*Hirondelle* **II** (1911–1912). *Bull. Inst. océanogr. Monaco* **279**: 1–23.

Gargiulo, G. M., De Masi, F. & Tripodi, G. 1985. A study on *Gracilaria dendroides* sp. nov. (Gigartinales, Rhodophyta) from the Bay of Naples. *Br. phycol. J.* **20**: 357–364.

219. **Gaudichaud [-Beaupré], C.** 1826; 1827. Botanique [pp. viii+[1]+522] . . . [Part 4, Livre II. Classification des herbiers . . .] . . . Algae, Agardh. *In* L. de Freycinet, *Voyage autour du monde, entrepris par ordre du roi, . . . Exécuté sur les corvettes de S.M.* l'Uranie *et* la Physicienne, *pendant les années 1817, 1818, 1819 et 1820*: 147–165. Paris.

Note. This represents one volume of an eight volume work. It is stated in the preface (p. vii) that the 'thalassiophytes' were determined by 'M. Agardh' (doubtless C. Agardh). Part 4, pp. 129–168, was published in June 1827. There are earlier geographically arranged chapters, pp. 3–146, that make occasional mention throughout of seaweeds for relevant areas. The Atlas is not relevant to the present work; there are no algal plates.

220. **Gauld, D. T. & Buchanan, J. B.** 1959. The principal features of the rock shore fauna in Ghana. *Oikos* **10**: 121–132.

221. **Gayral, P.** 1958. *La nature au Maroc II Algues de la côte Atlantique marocaine.* Rabat.

222. —— 1966. *Les algues des côtes Françaises (Manche et Atlantique) Notions fondamentales sur l'écologie, la biologie et la systematique des algues marines.* Paris.

223. **Gepp, A. & Gepp, E. S.** 1905. Atlantic algae of the 'Scotia'. *J. Bot., Lond.* **43**: 109–110.

Note. Also issued (repaged pp. 6–7) as a separate in combination with the same authors' 'Antarctic algae' [*J. Bot., Lond.* **43**: 105–109, 1905; repaged pp. 1–5].

578. —— —— 1912. Marine algae of the Scottish National Antarctic Expedition [Part VI, pp. 73–83]. *In* W. S. Bruce & R. N. R. Brown (Eds), *Report on the scientific results of the voyage of S.Y. 'Scotia' during the years 1902, 1903, and 1904 . . .*, Vol. III. – *Botany.* Edinburgh.

224. **Gerloff, J.** 1957. Einige Algen aus der Bucht von Daressalaam. *Willdenowia* **1**(5): 757–770.

225. **Gil-Rodriguez, M. C.** 1980 ['1979']. Revision taxonomica-ecologia del genero *Cystoseira* C. Ag. en el archipielago Canario. *Vieraea* **9**(1–2): 115–148.

226. —— **& Afonso-Carrillo, J.** 1980. Adiciones a la flora marina y catalogo ficologico para la Isla de Lanzarote. *Vieraea* **10** (1–2): 59–70.

227. —— —— 1981 ['1980']. *Catalogo de las algas marinas bentonicas (Cyanophyta, Chlorophyta, Phaeophyta y Rhodophyta) para el Archipielago Canario.* Tenerife.

229. —— **& Wildpret de la Torre, W.** 1980*a*. *Contribucion al estudio de la vegetacion ficologica marina del litoral Canario.* Tenerife [*Encyclopedia Canaria*].

230. —— —— 1980*b*. Contribucion a la ficologia de la Isla del Hierro. *Vieraea* **8**(2): 245–260.

231. —— **Acebes Ginoves, J. R. & Perez de Paz, P. L.** 1978. Nuevas aportaciones a la flora ficologica de las Islas Salvajes. *In* Anon., *Contribución al estudio de la historia natural de las Islas Salvajes*: 45–72. Resultados de la Expedición Cientifica 'Agamenon 76' (23 de febrero – 3 de marzo de 1976). Santa Cruz de Tenerife, Canarias.

232B. —— **Haroun Tabraue, R. [J.], Afonso-Carrillo, J. & Wildpret de la Torre, W.** 1985. Adiciones al catálogo de algas marinas bentonicas para el Archipielago Canario. II. *Vieraea* **15**(1–2): 101–112.

Gmelin, S. G. 1768. *Historia fucorum . . .* Leningrad.

233. **Gomez Garreta, A., Ribera Siguan, A. & Seoane-Camba, J.** 1979. Nuevas citas para la flora algológica de Baleares. *Acta bot. malacitana* **5**: 29–38.

235. **Gonzalez Henriquez, M. N.** 1976. Contribución al estudio del epifitismo en *Zostera marina* L. (Zosteraceae) en la playa de Las Canteras (Gran Canaria). *Botanica Macaronésica* **2**: 59–67.

236. **Gonzalez, N.** 1977*a*. Estudio de la vegetacion litoral de la zona de Maspalomas. *Botanica Macaronésica* **4**: 23–30.

237. —— 1977*b*. Estudio de la vegetacion bentonica litoral del noroeste de la Isla de Gran Canaria (Bañaderos, San Felipe, Sardina, Las Nieves). *Botanica Macaronésica* **4**: 85–104.

610. —— 1979 ['1978']. Contribucion al estudio algologico de la zona de Arinaga (Gran Canaria). *Botanica Macronésica* **5**: 47–60.

239. **Goor, A. C. J. van** 1923. Die Holländischen Meeresalgen (Rhodophyceae, Phaeophyceae und Chlorophyceae) insbesondere der Umgebung von Helder, des Wattenmeeres und der Zuidersee. *Verh. K. Akad. Wet., Amst.,* Tweede sectie, **23**(2): I–IX + [1] + 1–232.

Gretton, J. 1976. A desert state that vanished. *Geogrl Mag.* **49**(3): 155–160.

242. **Grunow, A.** 1868. Algae. *In* E. Fenzl (Ed.), *Reise der Österreichischen Fregatte* Novara *um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B. von Wüllerstorf-Urbair,* Botanischer Theil, **1**: 1–104. *Sporenpflanzen*, Wien.

589. **Guiry, M. D.** 1984. Structure, life history and hybridization of Atlantic *Gigartina teedii* (Rhodophyta) in culture. *Br. phycol. J.* **19**: 37–55.

447. ——1985? ['1984']. Photoperiodic and temperature responses in the growth and tetrasporogenesis of *Gigartina acicularis* (Rhodophyta) from Ireland. *Helgoländer wiss. Meeresunters.* **38**: 335–347.

Note. Reverse of front cover states printed 31.XII.1984 – hence publication date suggested as 1985.

243. —— **& Cunningham, E. M.** 1984. Photoperiodic and temperature responses in the reproduction of north-eastern Atlantic *Gigartina acicularis* (Rhodophyta: Gigartinales). *Phycologia* **23**: 357–367.

243A. —— **& T.-Freamhainn, M.** 1986 ['1985']. Biosystematics of *Gracilaria foliifera* (Forsskål) Børgesen (Gigartinales, Rhodophyta). *Nordic J. Bot.* **5**: 629–637.

245B. **Halos, M.-Th.** 1965. Sur trois Callithamniées des environs de Roscoff. *Cah. Biol. mar.* **6**: 117–134.

246. **Hamel, G.** 1927. *Recherches sur les genres* Acrochaetium *Naeg. et* Rhodochorton *Naeg.* Saint Lo.

247. —— 1924–1930. Floridées de France. I–II. *Revue algol.* **1**: 278–292, 427–457, 1924; III–IV. *Rev. algol.* **2**: 39–67, 280–309, 1925; V. *Revue algol.* **3**: 99–158, 1928; VI. *Revue algol.* **5**: 61–109, 1930.

Note. Reprint of I–II, repaged continuously 1–46 + [1]; III, repaged [2] + 50–80; IV, repaged [in error], 69–98; V, repaged 99–158 [repeats original]; VI, repaged 1–49.

249. **Hariot, P.** 1895. Liste des algues recueillies au Congo par M. H. Lecomte. *J. Bot. Paris* **9**: 242–244.

250. —— 1896 ['1895']. Contribution a la flore algologique du Gabon et du Congo français. *C. r. Ass. fr. Avanc. Sci.* **24**(2); 641–643.

251. —— 1908. Les algues de San Thome (cote occidentale d'Afrique). *J. Bot. Paris* II, **1**: 161–164.

252. —— 1911. Algues de Mauritanie recueillies par M. Chudeau. *Bull. Soc. bot. Fr.* **58** [= IV, **11**]: 438–445.

—— 1920. See no. 99.

253. **Haroun Tabraue, R. J., Gil-Rodríguez, M. C., Afonso-Carrillo, J. & Wildpret de la Torre, W.** 1984 ['1983']. Estudio del fitobenthos del Roque de los Organos (Gomera). Catalogo floristico. *Vieraea* **13**: 259–276.

253A. —— —— —— —— 1985? ['1984']. Estudio ecologico y fenologico de algunas especies del genero *Caulerpa* Lamouroux presentes en el Archipielago Canario. *Actas IV Simposio Iberico de Estudos do Benthos marinho,* **3**: 75–82, 1984.

583. —— —— —— —— 1985 ['1984']. Vegetacion bentonica del Roque de Los Organos (Gomera). *An. Biol., Univ. Murcia* **2** (Secc. Esp. 2): 107–117.

254. **Harvey, W. H.** 1846–1851. *Phycologia britannica*: . . ., vols II, III, *Rhodospermeae*, . . . vol. IV. *Chlorospermeae*, . . . [Synopsis nos. 280–388]. London.

255. —— 1860. *Phycologia australica; or, a history of Australian seaweeds;* . . . **3** London.

256. —— 1862. *Phycologia australica; or, a history of Australian seaweeds;* . . . **4**. London.

257. —— 1863. *Phycologia australica; or, a history of Australian seaweeds* . . . **[5]** . . . *and a synopsis of all known Australian algae.* London.

Hauck, F. 1885. Die Meeresalgen Deutschlands und Oesterreichs. *In* L. Rabenhorst, *Kryptogamen-Flora von Deutschlands, Oesterreich und der Schweiz.* 2nd ed., **2**. Leipzig.

259. **Hemsley, W. B.** 1885*a*. II. – Report on the botany of the Bermudas and various other islands of the Atlantic and Southern Oceans. [First part]. *In* C. W. Thompson & J. Murray, *Report on the scientific results of the Voyage of H.M.S.* Challenger *during the years 1873–76 under the*

command of Captain George S. Nares, R.N., F.R.S. and the late Captain Frank Tourle Thompson, R.N. . . ., Botany – **1**: 1–135. London.

260. —— 1885*b*. III – Report on the botany of the Bermudas and various other islands of the Atlantic and Southern Oceans. *In* C. W. Thompson & J. Murray, *Report on the scientific results of the voyage of H.M.S.* Challenger *during the years 1873–76 under the command of Captain George S. Nares, R.N., F.R.S. and the late Captain Frank Tourle Thompson, R.N. . . ., Botany* – **1**: 1–299. London.

261. **Henriques, J. [A]** 1885 ['1884']. Contribuição para o estudo da flora d'algumas possessões portuguezas I Plantas colhidas por F. Newton na Africa occidental. *Bolm Soc. broteriana* **3**: 129–140.

Note. See also no. 262.

262. **Henriques, I. [= J.] [A.], [De Toni, G. B., & Levi, D.]** 1886. Contribução para o estudo da flora d'algunas possessoes portuguezas. Plantas colhidas por F. Newton na Africa occidental. (dal Boletim da Sociedade Broteriana III–IV p. 129 – Coimbra 1885). Algae [pp. 121–122]. *In* G. B. De Toni & D. Levi, Contributiones ad phycologiam extra-italicam. *Notarisia* **1**: 117–122.

Note. This work was published in April 1886. An extract from Henriques (1885) (261); the reference has been cited as here since there is definite evidence that the text was affected by editing before reproduction in *Notarisia*. Mistakes present in the original have been corrected and new ones introduced.

263. **Henriques, J. [A]** 1886. Algae [pp. 217–221]. *In* J. [A.] Henriques, Contribuições para o estudo da Flora d'Africa. Flora de S. Thomé. *Bolm Soc. broteriana* **4**: 129–221.

264. —— 1887. Flora de S. Thomé. – [130] [pp. 381–383]. *In* G. B. De Toni & D. Levi, Contributiones ad phycologiam extra-italicam. *Notarisia* **2**: 375–383.

Note. A complete extract from Henriques (1886) (263); the present text has been attributed to Henriques solely, as there appear to be no alterations in the algal text.

265. —— 1917. Catálogo das espécies de animais e plantas até hoje encontradas na ilha de S. Tomè. *Bolm Soc. broteriana* **27**: 138–197.

267A. **Hoek, C. van den** 1982. The distribution of benthic marine algae in relation to the temperature regulation of their life histories. *Biol. J. Linn. Soc.* **18**: 81–144.

—— **& Cortel-Breeman, A. M.** 1970. Life-history studies on Rhodophyceae: III, *Scinaia complanata* (Collins) Cotton. *Acta Bot. neerl.* **19**: 457–467.

415. **Holmes, E. M.** 1905. Some South Orkney algae. *J. Bot., Lond.* **43**: 196–198.

268. **Hooker, J. D. [& Harvey, W. H.]** 1847. LV. Algae, *L. In* J. D. Hooker, *The botany of the antarctic voyage of H.M. Discovery ships* Erebus *and* Terror, *in the years 1839–1843 . . .* **1.** *Flora Antarctica, botany of Fuegia, the Falklands, Kuerguelen's Land, etc.*, Part II. *Algae*: 454–502. London.

269. **Hoppe, H. A.** 1969. Marine algae as raw materials. *In* T. Levring, H. A. Hoppe & O. J. Schmid, *Marine Algae A Survey of Research and Utilization.* Botanica Marina Handbooks **1**: 126–287. Hamburg.

270. —— **& Schmid, O. J.** 1962. Meeresalgen als moderne Industrieprodukte. *In* H. A. Hoppe (Ed.), Meeresalgen Industrielle Bedentrag und Verwendung. *Botanica mar.* **3** (Suppl.): 16–66.

271. **Hornemann, J. W.** 1819. *Anniversaria in memoriam reipublicae sacrae et litterariae cum universae, tum danicae nostrae restauratae celebranda indicit regia Universitatis hauniensis rector cum Senatu academico. De indole plantarum guineensium [observationes].* Hauniae.

Note. According to Hepper & Neate (1971) and Hepper (1976), Isert (the source of the material studied by Hornemann) collected both along the Ghanaian coastal part of what was Danish Guinea and at Whydah (= Ouidah), in present day Benin. Since the whole coast of Benin and Togo is, with the exception of more recent artificial installations and rocks exposed due to their interference with the natural west-east longshore drift of sand, sandy and/or lagoon in configuration and structure, we attribute the algal records (clearly from rocky substrata, if involving attached material) solely to the Ghanaian stretches. This ignores the possibility that Isert could have collected drift algal material in Togo and Benin.

Howe, M. A. 1917. A note on the structural dimorphism of sexual and tetrasporic plants of *Galaxaura obtusata. Bull. Torrey bot. Club* **43**: 621–624.

—— 1918. Further notes on the structural dimorphism of sexual and tetrasporic plants in the genus *Galaxaura. Mem. Brooklyn bot. Gdn* **1**: 191–197.

—— 1920. Algae [pp. 553–618]. *In* N. L. Britton & C. F. Millspaugh, *The Bahama Flora.* New York.

Hoyle, M. D. 1984. Taxonomic features used in discriminating some central and eastern Pacific species of *Gracilaria. Hydrobiologia* **116/117**: 47–50.

Note. Overall Proceedings also separately reprinted as Developments in Hydrobiology **22**.

Huisman, J. M. 1986. The red algal genus *Scinaia* (Galaxauraceae, Nemaliales) from Australia. *Phycologia* **25**: 271–296.

—— 1987. The taxonomy and life history of *Gloiophloea* (Galaxauraceae, Rhodophyta). *Phycologia* **26**: 167–174.

273. **Irvine, L. M.** 1983. *Seaweeds of the British Isles* **1** *Rhodophyta* Part 2A *Cryptonemiales (sensu stricto), Palmariales, Rhodymeniales*. London.

274. **Isaac, W. E.** 1956. The ecology of *Gracilaria confervoides* (L.) Grev. in South Africa with special reference to its ecology in the Saldanha-Langebaan Lagoon. *Proc. int. Seaweed Symp.* **2**: 173–185.

—— 1971. Marine botany of the Kenya coast. 5. A third list of Kenya marine algae. *J. East Afr. nat. Hist. Soc. and Natl Mus.* **28**: 1–23.

277. **Itono, H.** 1977*b*. Studies on the southern Japanese species of *Galaxaura* (Rhodophyta). *Micronesica* **13**: 1–26.

278. —— 1980. The genus *Galaxaura* (Rhodophyta) in Micronesia. *Micronesica* **16**: 1–19.

280. **Jaasund, E.** 1977*a*. Marine algae in Tanzania VI. *Botanica mar.* **20**: 405–414.

—— 1977*b*. Marine algae in Tanzania VII. *Botanica mar.* **20**: 415–425.

282. **Jardin, E.** 1851(?). *Herborisations sur la côte occidentale d'Afrique pendant les années 1845–1846–1847–1848*. Paris.

Note. A pair of extracts from the July 1850 and May 1851 numbers of *Nouvelles Annales de la Marine et des Colonies*. Texts clearly repaged, but division of present text probably represents at least the break between the parts as originally published, pp. 1–8 and pp. 9–19.

Johansen, H. W. 1981. *Coralline algae, a first synthesis*. pp. [10]+239. Boca Raton, Florida.

—— **& Silva, P. C.** 1978. Janieae and Lithotricheae: two new tribes of articulated Corallinaceae (Rhodophyta). *Phycologia* **17**: 413–417.

—— **& Womersley, H. B. S.** 1986. *Haliptilon roseum* (Corallinaceae, Rhodophyta) in southern Australia. *Aust. J. Bot.* **34**: 551–567.

286. **John, D. M.** 1972*a*. A new species of *Botryocladia* (Rhodophyceae, Rhodymeniales) from the Gulf of Guinea. *Phycologia* **12**: 33–36.

287. —— 1972*b*. The littoral ecology of rocky parts of the north-western shore of the Guinea Coast. *Botanica mar.* **15**: 199–204.

288. —— 1977 ['1976']. The marine algae of Ivory Coast and Cape Palmas in Liberia (Gulf of Guinea). *Revue algol.* II, **11**: 303–324.

290. —— 1986. Littoral and sub-littoral marine vegetation. *In* G. W. Lawson (Ed.), *Plant ecology in West Africa: systems and processes*: 215–246. New York, Chichester, Brisbane, Toronto.

291. —— **& Asare, S. O.** 1975. A preliminary study of the variations in yield and properties of phycocolloids from Ghanaian seaweeds. *Mar. Biol. Berlin* **30**: 325–330.

292. —— **& Lawson, G. W.** 1972 ['1971']. Additions to the marine algal flora of Ghana I. *Nova Hedwigia* **21**: 817–841.

293. —— —— 1972. The establishment of a marine algal flora in Togo and Dahomey (Gulf of Guinea). *Botanica mar.* **15**: 64–73.

294. —— —— 1974. Observations on the marine algal ecology of Gabon. *Botanica mar.* **17**: 249–254.

295. —— —— 1977*a*. The marine algal flora of the Sierra Leone Peninsula. *Botanica mar.* **20**: 127–135.

296. —— —— 1977*b*. The distribution and phytogeographical status of the marine algal flora of Gambia. *Feddes Reprium* **88**: 287–300.

611. —— ——1989. Littoral ecosystems of tropical West Africa. *In* A. C. Mathieson & P. H. Nienhuis (Eds), *Intertidal and littoral ecosystems*. Elsevier Series *Ecosystems of the world* Vol. **24**. (in press).

590. —— —— (not published). Additions to the marine algal flora of Ghana II.

Note. Originally submitted to *Nova Hedwigia* and reached page-proof, 21 Sept. 1972. Corrected and returned from Ghana, but no more heard of paper and never published. Revised dated by authors to 1973, 1974 and (finally before being abandoned) 1975. Much of the included information used subsequently elsewhere, but a few data not taken up and hence the present inclusion.

297. —— **& Pople, W.** 1973. The fish grazing of rocky shore algae in the Gulf of Guinea. *J. exp. mar. Biol. Ecol.* **11**: 81–90.

298. —— **Lawson, G. W. & Price, J. H.** 1981. Preliminary results from a recent survey of the marine algal flora of Angola (Southwestern Africa). *Proc. int. Seaweed Symp.* **8**: 367–371.

299. —— **Lieberman, D. & Lieberman, M.** 1977. A quantitative study of the structure and dynamics of benthic subtidal algal vegetation in Ghana (Tropical West Africa). *J. Ecol.* **65**: 497–521.

300. —— —— —— **& Swaine, M. D.** 1980. Strategies of data collection and analysis of subtidal vegetation. *In* J. H. Price, D. E. G. Irvine & W. F. Farnham (Eds), *The shore environment* **1**: 265–284. [Systematics Association special vol **17** (a)]. London.

—— **Price, J. H., Maggs, C. & Lawson, G. W.** 1979. Seaweeds of the western coast of tropical

Africa and adjacent islands: a critical assessment. III. Rhodophyta (Bangiophyceae). *Bull. Br. Mus. nat. Hist.* (Bot.) **7**: 69–82.

301. **J[ohnston], C. S.** 1966. Marine biological survey [pp. 43–54]. Ecological Reports [pp. 55–119]. *In* C. S. Johnston, *Canary Island biological expedition 1965 A scientific expedition to the Canary Island of Lanzarote organised by the Heriot Sub-aqua Club Edinburgh, expedition report* **1**: [2]+1–132. Edinburgh.
Note. Reproduced from typed stencils, but bound in a printed cover. Generally distributed.

302. **Johnston, C. S.** 1969*a*. Studies on the ecology and primary production of Canary Islands marine algae. *Proc. int. Seaweed Symp.* **6**: 213–222.

305. **Johnstone, W. G. & Croall, A.** 1859*a*. *The nature-printed British seaweeds: . . . 1. – Rhodospermeae.* Fam. I–IX. London.

306. —— —— 1859*b*. *The nature-printed British seaweeds: . . . 2. – Rhodospermeae.* Fam. X–XIII. London.

306B. **Jorge, D., Gonzalez, M. N. & Delgado, E.** 1986 ['1984']. Macrofitobentos del litoral del Puerto de las Nieves (Gran Canaria). *Botanica Macaronésica* **12–13**: 111–122.

312A. **Kensley, B. & Penrith, M.-L.** 1980. The constitution of the fauna of rocky intertidal shores of South West Africa. Part III. The north coast from False Cape Frio to the Kunene River. *Cimbebasia* A, **5**: 201–214.

313. **Kjellman, F. R.** 1900. Om Floridé-slägtet *Galaxaura* dess organografi och systematik. *K. svenska VetenskAkad. Handl.* **33** (1): 1–109.

Kraft, G. T. 1977. The morphology of *Grateloupia intestinalis* from New Zealand, with some thoughts on generic criteria within the family Cryptonemiaceae (Rhodophyta). *Phycologia* **16**: 43–51.

Krauss, F. 1846. Pflanzen des Cap- und Natal-Landes, gesammelt und zusammengestellt von Dr. Ferdinand Krauss. (Schluss). *Flora, Jena* **29**: 209–219.

316. **Kützing, F. T.** 1843. *Phycologia generalis oder Anatomie, Physiologie und Systemkunde der Tange.* Lipsiae.

317. —— 1847. Diagnosen und Bemerkungen zu neuen oder kritischen Algen. *Bot. Ztg* **5**: 1–5, 22–25, 33–38, 52–55, 164–167, 177–180, 193–198, 219–223.

318. —— 1849. *Species algarium.* Lipsiae.

319. —— 1858. *Tabulae phycologicae oder Abbildungen der Tange* **8**. Nordhausen.

320. —— 1862. *Tabulae phycologicae oder Abbildungen der Tange* **12**. Nordhausen.

324. —— 1866. *Tabulae phycologicae oder Abbildungen der Tange* **16**. Nordhausen.

325. —— 1867. *Tubulae phycologicae oder Abbildungen der Tange* **17**. Nordhausen.

326. —— 1868. *Tabulae phycologicae oder Abbildungen der Tange* **18**. Nordhausen.

—— 1869. *Tabulae phycologicae oder Abbildungen der Tange* **19**. Nordhausen.

331. **Lamouroux, J. F. V.** 1816. *Histoire des polypiers coralligènes flexibles, vulgairement nommés zoophytes.* Caen.

332. —— 1824. CORALLINE; *corallina*; LINN. *In* [J.F.V.] Lamouroux, [J.B.G.M.] Bory de Saint-Vincent & E. Deslongchamps, *Encyclopédie méthodique. Histoire naturelle des zoophytes, ou animaux rayonnés, faisant suite à l'histoire des vers, de Bruguière*: 212–217. Paris, 1824/1827.

335. **Lawson, G. W.** 1953. The general features of seaweed zonation on the Gold Coast. *Proc. int. Seaweed Symp.* **1**: 18–19.

594. —— 1954. Agar from *Gracilaria henriquesiana*. *Am. J. Bot.* **41**: 212–214.

336. —— 1954. Seaweeds from Sierra Leone. *Jl W. Afr. Sci. Ass.* **1**(1): 63–67.

337. —— 1955. Rocky shore zonation in the British Cameroons. *Jl W. Afr. Sci. Ass.* **1**(2): 78–88.

338. —— 1956. Rocky shore zonation on the Gold Coast. *J. Ecol.* **44**: 153–170.

339. —— 1957*a*. Some features of the intertidal ecology of Sierra Leone. *Jl W. Afr. Sci. Ass.* **3**: 166–174.

340. —— 1957*b*. Seasonal variation of intertidal zonation on the coast of Ghana in relation to tidal factors. *J. Ecol.* **45**: 831–860.

344. —— 1966*a*. The littoral ecology of West Africa. *Oceanography mar. Biol. ann. Rev.* **4**: 405–448.

345. —— 1966*b*. *Plant life in West Africa.* London, Accra, Ibadan.
Note. Second edition (1986) with the same algal text.

—— 1978. The distribution of seaweed floras in the tropical and subtropical Atlantic Ocean: a quantitative approach. *Bot. J. Linn. Soc.* **76**: 177–193.

346. —— 1980. Unpublished list (in litt.) of benthic marine algae from the intertidal and shallow subtidal of Fernando Póo (Bioko) collected during a field trip in December 1980.

348. —— **& Isaac, W. E.** 1982. The marine algal flora of Namibia: its distribution and affinities. Unpublished manuscript.

349. —— **& John, D. M.** 1977. The marine flora of the Cap Blanc peninsula: its distribution and affinities. *Bot. J. Linn. Soc.* 75: 99–118.

350. ———— 1982. The marine algae and coastal environment of tropical West Africa. *Beih. Nova Hedwigia* **70**. Vaduz.
Note. The section on the genus *Callithamnion* (pp. 276–281) is by J. H. Price.

586. —— **& John, D. M.** 1987. The marine algae and coastal environment of tropical West Africa (second edition). *Beih. Nova Hedwigia* **93**.
Note. The section on the genus *Callithamnion* (pp. 261–267 and pl. 45, figs 7–9) is by J. H. Price.

351. —— **& Norton, T. A.** 1971. Some observations on littoral and sublittoral zonation at Teneriffe (Canary Isles). *Botanica mar.* **14**: 116–120.
—— **& Price, J. H.** 1969. Seaweeds of the western coast of tropical Africa and adjacent islands: a critical assessment. I. Chlorophyta and Xanthophyta. *Bot. J. Linn. Soc.* **62**: 279–346.

352. —— **John, D. M. & Price, J. H.** 1975. The marine algal flora of Angola: its distribution and affinities. *Bot. J. Linn. Soc.* **70**: 307–324.

357. **Lemoine, [M.] P.** 1917*a*. Fam. 5. *Corallinaceae*. Subfam. 1. Melobesieae. *Dansk bot. Ark.* **3**(1c): 147–182.

372. **Levring, T.** 1953. The marine algae of Australia I. Rhodophyta: Goniotrichales, Bangiales and Nemalionales. *Archiv. Bot.* II, **2**: 457–530.

374. —— 1969. The vegetation in the sea. *In* T. Levring, H. A. Hoppe & O. J. Schmid, *Marine algae A survey of research and utilization*: 1–46. Botanica Marina handbooks **1**. Hamburg.

375. —— 1974. The marine algae of the archipelago of Madeira. *Bolm Mus. munic. Funchal* **28**(125): 1–111.

376. **Lieberman, M., John, D. M. & Lieberman, D.** 1979. Ecology of subtidal algae on seasonally devastated cobble substrates off Ghana. *Ecology* **60**: 1151–1161.

377. ———— 1984. Factors influencing algal species assemblages on reef and cobble substrata off Ghana. *J. exp. mar. Biol. Ecol.* **75**: 129–143.
Littler, M. M., Littler, D. S. & Taylor, P. R. 1987. Functional similarity among isomorphic life-history phases of *Polycavernosa debilis* (Rhodophyta, Gracilariaceae). *J. Phycol.* **23**: 501–505.

378. **Longhurst, A. R.** 1958. An ecological survey of the West African marine benthos. *Fishery Publs colon. Off.* **11**: 1–102.

379. **López Hernández, M. & Gil-Rodríguez, M. C.** 1982 ['1981']. Estudio de la vegetación ficologica del litoral comprendido entre Cabezo del Socorro y Montaña de la Mar, Güímar, Tenerife. *Vieraea* **11**: 141–170.

380. ———— **& Afonso-Carrillo, J.** ?1986. Sobre la presencia de *Rhodophyllis divaricata* (Stackhouse) Papenfuss (Rhodophyllidaceae Engler, Rhodophyta) en el Archipíelago Canario. *An. Fac. Cienc. La Laguna,* Vol. especial 'Homenaje T. Bravo' (in press).

381. **Lowe, R. T.** 1869. *Florulae salvagicae tentamen*; . . . London.

567. **Lüning, K.** 1985. *Meeresbotanik Verbreitung, Ökophysiologie und Nutzung der marinen Makroalgen*. Stuttgart, New York.

381A. **McLachlan, J. & Bird, C. J.** 1985? ['1984']. Geographical and experimental assessment of the distribution of *Gracilaria* species (Rhodophyta: Gigartinales) in relation to temperature. *Helgoländer wiss. Meeresunters.* **38**: 319–334.
Note. See the note to reference 447.

593. ———— 1986. *Gracilaria* (Gigartinales, Rhodophyta) and productivity. *Aquat. Bot.* **26**: 27–49.

614. **Maggs, C. A. & Guiry, M. D.** 1988 ['1987']. *Gelidiella calcicola* sp. nov. (Rhodophyta) from the British Isles and Northern France. *Br. phycol. J.* **22**: 417–434.

383. **Magruder, W. H.** 1984. Reproduction and life history of the red alga *Galaxaura oblongata* (Nemaliales, Galaxauraceae). *J. Phycol.* **20**: 402–409.

384. **Marchal, E.** 1960. Premières observations sur la répartition des organismes de la zone intercotidale de la région de Konakri (Guinée). *Bull. Inst. fr. Afr. noire* A, **22**: 137–141.

385. **Martens, G. von.** 1866. *Die Preussische Expedition nach Ost-Asien. Nach amtlichen Quellen. Botanischer Theil. I. Die Tange*. Berlin.

386. **Martin Aguado, M.** 1957. Las algas de Canarias en la obra cientifica de Viera y Clavijo. *An. Univ. La Laguna, Facult. Filos Letr.* **1957**: 6–52.
Note. See also no. 548.

390. **Mazza, A.** 1905–1925. Saggio di algologia oceanica. *Nuova Notarisia* **16**: 85–101, 129–141, 1905; **17**: 1–13, 41–56, 81–101, 129–150, 1906; **18**: 1–36, 65–98, 126–152, 177–195, 1907; **19**: 1–24, 49–66, 109–129, 153–170, 1908; **20**: 6–18, 65–86, 113–135, 1909; **21**: 1–27, 65–99, 125–152, 169–199, 1910; **22**: 7–25, 53–80, 109–139, 157–171, 1911; **23**: 1–24, 57–78, 109–122, 1912; **24**:

57–85, 157–174, 1913; **27**: 1–53, 104–155, 169–215, 1916; **28**: 176–239, 1917; Agguinte al saggio di algologica oceanica (Florideae). *Nuova Notarisia* **30**: 1–62, 1919; **31**: 93–160, 1920; **32**: 1–48, 1921; **33**: 97–125, 1922.

391. **Mellis, J. C.** 1875. *St. Helena; a physical, historical, and topographical description of the island, including its geology, fauna, flora, and meteorology*. London.
Note. Mellis repeats, apparently with additional habitat data, the list given by Dickie (142), who determined the algae.

392. **Meñez, E. G. & Mathieson, A. C.** 1981. The marine algae of Tunisia. *Smithson. Contr. mar. Sci.* **10**: i–viii + 1–59.

393. **Michanek, G.** 1971. *A preliminary appraisal of world seaweed resources. Fish. Circ. FAO* No. **128**. Rome.

394. —— 1975. *Seaweed resources of the ocean. Fish. tech. Pap. FAO* No. **138**. Rome.

395. —— 1979. Phytogeographical provinces and seaweed distribution. *Botanica mar.* **22**: 375–391.

398. **Mollion, M. J.** 1973. Etude preliminaire des *Hypnea* au Senegal comme source de phycocolloides. *Botanica mar.* **16**: 221–225.

399. —— 1976 ['1975']. Étude quantitative d'une formation végétale marine de l'infralittoral supérieur au Sénégal. *Bull. Inst. fond. Afr. noire* A, **37**: 537–554.

401. **Montagne, [J. F.] C.** 1839–1841 ['1835–50']. Plantes cellulaires. *In* P. Barker-Webb & S. Berthelot, *Histoire Naturelle des Iles Canaries, . . .* **3**(2), *Phytographia Canariensis*, Sectio ultima. [**3**(2)]: I–XV + [1] + 1–208. Paris.
Note. For detailed consideration of the bibliography of this work see Stearn in *J. Soc. Biblphy nat. Hist.* **1**: 49–63 (1937). The correct date of publication is probably 1841; the Introduction by Montagne is dated Paris, 1/1/1841.

402. —— 1842. Troisième centurie de plantes cellulaires exotiques nouvelles. *Annls Sci. nat.* (Bot.) **18**: 241–282.

403. —— 1846*a*. Ordo I. Phyceae Fries. *In* [M. C.] Durieu de Maissonneuve, *Flore d'Algérie. Cryptogamie. Première Partie*: 1–197. Paris, 1846–1849.

404. —— 1846*b*. Cryptogamae cellulares. Classis I. Phyceae (I) Fries. *In* C. Gaudichaud, *Voyage autour du monde exécuté pendant les années 1836 et 1837 sur la corvette* La Bonite . . ., *Botanique . . . 1 Cryptogames cellulaires et vasculaires (Lycopodinées)*: 1–112. Paris.

405. —— 1853*a*. Phyceae. *In* P. B. Webb, *Otia Hispanica seu detectus plantarum ramosum aut nondum rite notarum per Hispanias sponte nascentium*. 2nd ed.: 12–17. Paris.

406. —— 1853*b*. *Phyceae hispanicae novae aut minus notae . . .* Paris.
Note. A reprint of the text of reference 405.

407. —— 1856. *Sylloge generum specierumque cryptogamarum quas in variis operibus descriptas iconibusque illustratas . . .* Paris.

408. —— 1860. Florula gorgonea seu enumeratio plantarum cellularium quas in promontorio Viridi (*cap Vert*) insulisque adjacentibus a diversis botanicis et imprimis Cl. Bolle, berolinensi, hucusque collectas, recognovit descripsitque. *Annls Sci. nat.* (Bot.) IV, **14**: 210–225.

410. **Murray, G.** 1888–89. Catalogue of the marine algae of the West Indian region. *J. Bot., Lond.* **26**: 193–196, 237–243, 303–307, 331–338, 358–363, 1888; **27**: 237–242, 257–262, 298–305, 1889.
Note. Re-paged reprints of the continuous text, pp. 1–46 [1888, pp. 1–28; 1889, pp. 28–46].

411. **Naegelé, A.** 1960. Note sur le peuplement algal de la presqu'ile du Cap-Vert. *Notes afr.* **88**: 118–119.

414. **Niell, [F.] X.** 1974. Les applications de l'Indice de Shannon à l'étude de la végétation intertidale. *Bull. Soc. phycol. Fr.* **19**: 238–254.

—— **Miranda, A. & Pazó, J. P.** 1980. Studies on the morphology of the megaecade *limicola* of *Fucus vesiculosus* L. with taxonomical comments. *Botanica mar.* **23**: 303–307.

415. See **Holmes, E. M.** 1905.

416. **Norris, J. N. & Bucher, K. E.** 1982. Marine algae and seagrasses from Carrie Bow Cay, Belize. *In* K. Rützler & I. G. Macintyre (Eds), The Atlantic barrier reef ecosystem at Carrie Bow Cay, Belize, I. Structure and communities. *Smithson. Contr. mar. Sci.* **12**: 167–238.

418. **Ohmi, H.** 1958. On aberrant antheridial conceptacles found in *Gracilaria henriquesiana* Hariot from the Gold Coast, Africa. *Bull. Jap. Soc. Phycol* **6**: 4–7.

419. —— 1968. A descriptive review of *Gracilaria* from Ghana, West Africa. *Bull. Fac. Fish. Hokkaido Univ.* **19**: 83–86.

Oliveira, f., E. C. de 1983. Taxonomic criteria in the genus *Gracilaria* Grev. (Rhodophyta) – an experience with the western Atlantic species. *In* Anon., *Abstracts IXth International Seaweed Symposium 19–25 June 1983 Qingdao, China*: 196. Qingdao.

—— 1984. Taxonomic criteria in the genus *Gracilaria* Grev. (Rhodophyta): an experience with the

western Atlantic species [pp. 55–58]. *In* I. A. Abbott (Ed.), *Taxonomy of* Gracilaria . . . pp. 41–62. *In* H. J. Dumont . . . C. J. Bird & M. A. Ragan (Eds). XIth International Seaweed Symposium held in Qingdao, People's Republic of China, June 19–25, 1983. *Hydrobiologia* **116/117**: XXXI + [1] + 1–624.

Note. Overall proceedings also separately reprinted as *Developments in Hydrobiology* **22**.

—— **& Plastino, E. M.** 1982. The life history of some species of *Gracilaria* from Brazil. *In* Anon, *Scientific Programme and Abstracts*: a12. First International Phycological Congress, St. John's, Newfoundland, Canada, 8–14 August 1982. St John's.

—— —— 1984. The life history of some species of *Gracilaria* (Rhodophyta) from Brazil. *Jap. J. Phycol.* **32**: 203–208.

—— **Bird, C. J. & McLachlan, J.** 1983. The genus *Gracilaria* (Rhodophyta, Gigartinales) in the western Atlantic. *Gracilaria domingensis, G. cervicornis*, and *G. ferox*. *Can. J. Bot.* **61**: 2999–3008.

—— **McLachlan, J. & C. J. Bird** 1982. Towards a monograph of the species of *Gracilaria* in the western Atlantic. *In* Anon., *Scientific Programme and Abstracts*: a36. First International Phycological Congress, St. John's, Newfoundland, Canada, 8–14 August 1982. St John's.

423. **Palminha, F.** 1960. Sobre a prospecção algológica com fins industriais efectuada no arquipélago de Cabo Verde Campanha Oceanográfica do N.O. 'Baldaque da Silva' no ano de 1958. *Notas mimeogr. Cent. Biol. pisc.* **11**: [1] + 1–7.

424. —— 1961. A existência de algas agarófitas em Angola. *Notas mimeogr. Cent. Biol. pisc.* **16**.

425. —— 1967. Sobre a distribuição e abundância de *Gelidium cartilagineum* (L.) Gaillon na costa de Angola. *Notas mimeogr. Cent. Biol. aquát. trop.* **7**: [2] + 1–13 + [6].

Papenfuss, G. F. 1943. Notes on South African marine algae, II. *Jl S. Afr. Bot.* **9**(3): 79–92.

431. —— 1952. Notes on South African marine algae. III. *Jl S. Afr. Bot.* **17**(4): 167–188.

433. —— 1967 ['1966']. Notes on algal nomenclature – V. Various Chlorophyceae and Rhodophyceae. *Phykos* **5**: 95–105.

434. —— 1968. Notes on South African marine algae. V. *Jl S. Afr. Bot.* **34**: 267–287.

435. —— **& Chiang, Y.-M.** 1969. Remarks on the taxonomy of *Galaxaura* (Nemaliales, Chaetangiaceae). *Proc. int. Seaweed Symp.* **6**: 303–314.

436. —— **Mshigeni, K. E. & Chiang, Y.-M.** 1982. Revision of the red algal genus *Galaxaura* with special reference to the species occurring in the western Indian Ocean. *Botanica mar.* **25**: 401–444.

437. **Penrith, M.-L. & Kensley, B. F.** 1970*a*. The constitution of the intertidal fauna of rocky shores of South West Africa. Part I. Lüderitzbucht. *Cimbebasia* A, **1**: 189–239.

438. —— —— 1970*b*. The constitution of the fauna of rocky intertidal shores of South West Africa. Part II. Rocky Point. *Cimbebasia* A, **1**: 241–268.

439. **Piccone, A.** 1884. *Crociera del* Corsaro *alle Isole Madera e Canarie del capitano Enrico d'Albertis Alghe*. Genova.

441. —— 1886*a*. Pugillo di alghe Canariensi. *Nuovo G. bot. Ital.* **18**: 119–121.

Note. Some data repeated in Piccone (1886) (444).

444. —— 1886*d*. Pugillo di Alghe canariensi – [32]. *Notarisia* **1** (3): 152.

Note. Repeats data from Piccone (1886) (441).

445. —— 1886*e*. *Alghe del viaggio di circumnavigazione della Vettor Pisani.* Genova.

Note. See Piccone (1887) (446) for repeated data.

446. —— 1887. *Alghe del viaggio di circumnavigazione della Vettor Pisani* – [ ] Elenchi parziali delle alghe raccolte nelle diverse località. *In* G. B. De Toni & D. Levi, Contributiones ad phycologiam extra-italicam. *Notarisia* **2**(5): 283–287.

Note. This work is, as far as can be determined, an exact copy of the text in Piccone (1886) (445). The latter is therefore credited with authorship.

447. See **Guiry, M. D.** 1984/5. (447).

448. **Piccone, A.** 1889. Alghe della crociera del 'Corsaro' alle Azzorre. *Nuovo G. bot. Ital.* **21**: 171–214.

449. —— 1890 ['1889']. Nuove alghe del viaggio di circumnavigazione della 'Vettor Pisani'. *Atti Accad. naz. Lincei Memorie* IV, **6**: 10–63.

452. **Pickering, C. H. C. & Hansen, A.** 1969. Scientific Expedition to the Salvage Islands July 1963 IX. List of higher plants and cryptogams known from the Salvage Islands [pp. 63–71]. *In* A. Hansen, Checklist of the vascular plants of the Archipelago of Madeira. With a special list of plants, including cryptogams, from the Salvage Islands. *Bolm Mus. munic. Funchal* **24**: 1–74.

453. **Pilger, R.** 1908. Kleinere Beiträge zur Kenntnis der Meeresalgen I. *Hedwigia* **48**: 178–183.

454. —— 1911 ['1911–12']. Die Meeresalgen von Kamerun. Nach der Sammlung von C. Ledermann. *In* A. Engler, Beiträge zur Flora von Afrika. XXXIX. *Bot. Jb.* **46**: 294–313; 316–323.

456. —— 1920 ['1920–21']. Algae Mildbraedianae Annobonenses [pp. 1–14]. *In* A. Engler, Beiträge zur Flora von Afrika. XLVIII. *Bot. Jb.* **57**: 1–301.
Note. See also Pilger (1922) (457).

457. —— 1922. Algae [pp. 157–158]. Algae. Corallinaceae [p. 158]. *In* J. Mildbraed, *Wissenschaftliche Ergebnisse der Zweiten Deutschen Zentral-Afrika-Expedition 1910–1911 . . .* **11**: *Botanik.* Leipzig.
Note. 'Algae' is a repeat of Pilger (1920) (456) and 'Algae. Corallinaceae' of Pilger (1919) (455).

460. **Post, E.** 1955*a*. Weitere Daten zur Verbreitung des Bostrychietum IV. *Arch. Protistenk.* **100**: 351–377.

474. **Price, J. H. & John, D. M.** 1978. Subtidal ecology in Antigua and Ascension: a comparison. *Prog. underwat. Sci.* [*Rep. underwat. Ass.* II] **3**: 111–133.

475. —— —— 1980. Ascension Island, south Atlantic: a survey of inshore benthic macroorganisms, communities and interactions. *Aquatic Bot.* **9**: 251–278.

—— —— **& Lawson, G. W.** 1978. Seaweeds of the western coast of tropical Africa and adjacent islands: a critical assessment. II. Phaeophyta. *Bull. Br. Mus. nat. Hist.* (Bot.) **6**: 87–182.

—— —— —— 1986. Seaweeds of the western coast of tropical Africa and adjacent islands: a critical assessment. IV. Rhodophyta (Florideae) 1. Genera A–F. *Bull. Br. Mus. nat. Hist.* (Bot.) **15**: 1–122.

476. **Primo, C.** 1953. A contribution to the study of the seaweeds of Spanish West Africa. *Proc. int. Seaweed Symp.* **1**: 23–24.

597. **Prud'homme van Reine, W. F. & Lobin, W.** 1986. Katalog der von den Kapverdischen Inseln beschriebenen Taxa von Algen (Algae: Chlorophyceae, Phaeophyceae & Rhodophyceae). *Cour. Forsch.-Inst. Senckenberg* **81**: 85–88.

598. —— *In litt.* extractions of report on red algal distribution patterns; to JHP, 10/4/87.

479. **Purchon, R. D.** 1963. *Practical animal biology for the Tropics (West African edition).* London.

Rao, P. Sreenivasa 1970. Systematics of Indian Gelidiales. *Phykos* **9**: 63–78.

482. **Reinbold, T.** 1907. Die Meeresalgen der deutschen Tiefsee-Expedition 1898–1899. *In* C. Chun (Ed.), *Wissenschaftliche Ergebnisse der deutschen Tiefsee – Expedition auf dem Dampfer* 'Valdivia' *1898–1899.* **2** (2/4): 549–586. Jena.

483. —— 1908. Die Meeresalgen der Deutschen Südpolar-Expedition 1901–1903. *In* E. von Drygalski (Ed.), *Deutsche Südpolar-Expedition 1901–1903 im Auftrage des Reichsministeriums des Innern* **8** Botanik (2): 177–202. Berlin & Leipzig.
Note. 1928 is the publication date of the whole volume and of the last part; the earlier parts were published separately at various dates as completed (1906; 1908; 1911; 1924; 1928).

584. **Ribera Siguán, M. A., Gómez Garreta, A. & Seoane-Camba, J. A.** 1985 ['1984']. Estudio biogeográfico de la flora algológica bentónica marina de Las Islas Baleares. *An. Biol. Univ. Murcia* **2** (Secc. Esp. 2): 147–159.

484. **Richardson, W. D.** 1969. Some observations on the ecology of Trinidad marine algae. *Proc. int. Seaweed Symp.* **6**: 357–363.

577. **Riouall, R., Guiry, M. D. & Codomier, L.** 1985. Introduction d'une espèce foliacée de *Grateloupia* dans la flore marine de l'Étang de Thau (Hérault, France). *Cryptog.: algol.* **6**: 91–98.

485. **Rodrigues, J. E. de M.** 1960. Revisão das algas de S. Tomé e Príncipe do herbário do Instituto Botânico de Coimbra. I – Phaeophyta. *Garcia de Orta* **8**: 583–595.

486. **Rodriguez, O.** 1953. Seaweeds of industrial interest in the Canary Islands. *Proc. int. Seaweed Symp.* **1**: 75–76.

612. **Rotmann, K. W. G.** 1987. The collection, utilization and potential farming of red seaweeds in Namibia. [*Proc. int. Seaweed Symp.* **12**]. *Hydrobiologia* **151/152**: 301–305.

487. **Round, F. E.** 1981. *The ecology of algae.* Cambridge.

Santelices, B. & Stewart, J. G. 1985. Pacific species of *Gelidium* Lamouroux and other Gelidiales (Rhodophyta), with keys and descriptions to the common or economically important species [pp. 17–31]. *In* I. A. Abbott & J. N. Norris (Eds), *Taxonomy of economic seaweeds With reference to some Pacific and Caribbean species.* La Jolla, California.

489. **Santos Guerra, A.** 1972. Contribución al estudio de la flora marina de la Isla de La Gomera. *Vieraea* **2**(1): 86–102.

490. —— **Acuña G.[onzáles], A. & Wildpret [De La Torre], W.** 1970. Contribución al estudio de la flora marina de la Isla de La Palma. *Cuad. Bot. canaria* **9**: 20–29.

491. **Sanusi, S. S.** 1980. *A study of grazing as a factor influencing the distribution of benthic littoral algae.* M.Sc. thesis, University of Ghana.

493. **Sauvageau, C.** 1912. A propos des *Cystoseira* de Banyuls et Guéthary. *Bull. Stn biol. Arcachon* **14**: 133–556.

Note. There also exists a separate, repaged 1–424.

495. **Schiffner, V.** 1931. Neue und bemerkenswerte Meersalgen. *Hedwigia* **71**: 139–160; 161–205.

497. **Schmidt, O. C.** 1929*a*. Beiträge zur Kenntnis der Meeresalgen der Azoren I. *Hedwigia* **69**: 95–113.

498. —— 1929*b*. Beiträge zur Kenntnis der Meeresalgen der Azoren II. *Hedwigia* **69**: 165–172.

499. —— 1931. Die marine Vegetation der Azoren in ihren Grundzügen dargestellt. *Biblthca bot.* **102**: 1–116.

500. —— **& Gerloff, J.** 1957. Die marine Vegetation Afrikas in ihren Grundzügen dargestellt. *Willdenowia* **1**: 709–756.

503. **Schmitz, F. & Hauptfreisch, P.** 1896. Chaetangiaceae. *In* A. Engler & K. Prantl, *Die natürlichen Pflanzenfamilien* **1**(2): 335–339. Leipzig.

504. —— —— 1896. Gelidiaceae. *In* A. Engler & K. Prantl, *Die natürlichen Pflanzenfamilien* **1**(2): 340–349. Leipzig.

506. —— —— 1896–97. Sphaerococcaceae. *In* A. Engler & K. Prantl, *Die natürlichen Pflanzenfamilien* **1**(2): 382–396. Leipzig.

509. —— —— 1897. Gloiosiphoniaceae. *In* A. Engler & K. Prantl, *Die natürlichen Pflanzenfamilien* **1**(2): 505–508. Leipzig.

Schneider, C. W. 1975. Taxonomic notes on *Gracilaria mammillaris* (Mont.) Howe and *Gracilaria veleroae* Dawson (Rhodophyta, Gigartinales). *Taxon* **24**: 643–646.

514. **Schotter, G., Feldmann, J. & Magne, M.-F.** 1968. Recherches sur les Phyllophoracées. *Bull. Inst. océanogr. Monaco* **67**(1383): 1–99.

570. **Seagrief, S. C.** 1984. A catalogue of South African green, brown and red marine algae. *Mem. bot. Surv. S. Afr.* **47**: i–vi + 1–72.

Note. For the purposes of this part of the list, this reference has been allocated a number since it contains records for the area.

517. **Seoane-Camba, J.** 1965. Estudios sobre las algas bentónicas en la costa sur de la Península Ibérica (litoral de Cadiz). *Investigación pesq.* **29**: 3–216.

574. —— 1977. Sur une nouvelle espèce de *Gelidiella* trouvée aux Iles Canaries: *Gelidiella tinerfensis* nov. sp. *Bull. Soc. phycol. France* **22**: 127–134.

518. —— 1979. Sobre algunas Gelidiaceas nuevas o poco conocidas de las costas Españolas. *Acta bot. malacitana* **5**: 99–112.

Setchell, W. A. & Mason, L. 1943. New or little known crustaceous corallines of Pacific North America. *Proc. Natl Acad. Sci. U.S.A.* **29**: 87–92.

519. **Simons, R. H.** 1964. Species of *Plocamium* on the South African coast. *Bothalia* **8**: 183–193.

521. —— 1970. Marine algae from southern Africa 1. Six new species from the inter- and infra-tidal zones. *Investl Rep. Div. Sea Fish. Rep. S. Afr.* **88**: [4] + 1–13.

522. —— 1973. Unpublished list (in litt.) of species from South West Africa, principally collected during a Graves/Isaac/Lawson/Simons field trip in 1957. Known to be incomplete.

522A. —— **[Lawson, G. W. & Isaac, W. E.]** 1982. *Namibian seaweeds and their biogeographic affinities.* Unpublished manuscript based on the same trip and data as in 348 and 522 (*q.v.*).

523. —— 1974. Algae, (including diatoms and seaweeds) [pp. 239–261]. *In* J. H. Day, N. A. H. Millard, & M.-L. Penrith, *A guide to marine life on South African shores.* 2nd ed. Cape Town & Rotterdam.

Note. The first edition (not seen) was probably 1969, since that is the copyright date and the Preface is dated April 1968. Overall tripartite editorship is obvious from both Copyright allocation and statements in Preface. Latter also clearly indicates responsibility of R. H. Simons for algal section. Presumably algal content of first edition was as in second, since preface statement unchanged from past. Relevant records are for Namibia.

Sjöstedt, L. G. 1926. Floridean studies. *Lunds Univ. Årsskr.* N.F. Avd. 2, **22**(4): 1–95.

Sonder, O. W. 1845. Nova algarum genera et species quas in itinere ad oras occidentales Novae Hollandiae, collegit L. Preiss, Ph. Dr. *Bot. Ztg* **3**: 49–57.

—— 1846. Algae. *In* C. Lehmann, *Plantae Preissianae* **2**: 148–160. Hamburg.

528. **Sonder, [O. W.]** 1852. Algae. *In* J. A. Schmidt, *Beiträge zur Flora der Cap Verdischen Inseln. Mit Berücksichtigung aller bis jetzt daselbst bekannten wildwachsenden und kultivirten Pflanzen. Nach eigenen Untersuchungen und mit Benutzung der gewonnenen Resultate anderer Reisenden*: 125/127. Heidelberg.

Note. The algal material was sent to Sonder in Hamburg; he worked on the plants and provided both the determinative data and text as printed.

529. **Sourie, R.** 1954*a*. Contribution a l'étude écologique des côtes rocheuses du Sénégal. *Mém. Inst. fr. Afr. noire* **38**: 1–342 + [1].

Note. From the note on p. 117, it is clear that the algae were worked on mainly by J. Feldmann, but that Sourie took account of some of the views of Dangeard as expressed in the latter's memoir on the Cap Vert (Dakar) peninsula algae. Since the exact contribution of the various people involved is in doubt, we have left the reference in the name of Sourie, who seems to have exercised overall authorship.

530. —— 1954*b*. Principaux types de zonations verticales des algues sur le littoral rocheux de la presqu'île du Cap Vert (Zone intercotidale). *Rapp. Commun. int. bot. Congr.* **8**(17): 151–153.

531. —— 1954*c*. Étude écologique sommaire des fonds sableux en Baie de Dakar. *Annls Ec. sup. Sci. Dakar* **1**: 141–155.

Note. Sourie stated (p. 141) that many of the specific determinations of algae were by J. Feldmann.

533. **Southward, A. J.** 1958. The zonation of plants and animals on rocky sea shores. *Biol. Rev.* **33**: 137–177.

Stafleu, F. A. & Cowan, R. S. 1976. *Taxonomic literature. A selective guide to botanical publications and collections with dates, commentaries and types* **1**: A–G. 2nd ed. [*Regnum veg.* **94**]. Utrecht.

535. **Steentoft, M.** 1967. A revision of the marine algae of São Tomé and Príncipe (Gulf of Guinea). *J. Linn. Soc.* (Bot.) **60**: 99–146.

599. **Stegenga, H.** 1986. The Ceramiaceae (excl. *Ceramium*) (Rhodophyta) of the South West Cape Province, South Africa. *Biblthca phycol.* **74**: 1–149.

537. **Stephenson, T. A. & Stephenson, A.** 1972. *Life between tidemarks on rocky shores.* San Francisco.

Sunding, P. 1972. *A botanical bibliography of the Cape Verde Islands*. Oslo [Botanical Garden, University of Oslo]. Stencilled.

—— 1973. *A botanical bibliography of the Canary Islands.* 2nd ed. Oslo [Botanical Garden, University of Oslo]. Stencilled.

538. **Svedelius, N.** 1911. Florideae. *In* A. Engler & K. Prantl, *Die natürlichen Pflanzenfamilien* **1**(2): 200–276. Leipzig.

539. **Tandy, G.** 1944. Algae. *In* A. W. Exell, *Catalogue of the vascular plants of S. Tomé (with Principe and Annobon)*: 386, Appendix I. London.

Taylor, W. R. 1939. Algae collected on the presidential cruise of 1938. *Smithson. misc. Collns* **98**: 1–18.

—— 1945. Pacific marine algae of the Allan Hancock expeditions to the Galapagos Islands. *Allan Hancock Pacific Expedns* **12**: [8] + i–iv + 528.

540. —— 1960. *Marine algae of the eastern tropical and subtropical coasts of the Americas.* Ann Arbor.

542. **Trochain, J.** 1940. Contribution a l'étude de la végétation du Sénégal. *Mém. Inst. fr. Afr. noire* **2**: [1–6] + 1–433 + [63].

Note. J. Feldmann clearly had a great deal to do with the main determinations on which the algal list (pp. 108–110) was based; since the extent to which the data were accepted or amended by Trochain is not clear, and since there are other parts to the text which seem definitely to have been attributable to Trochain, we have accepted the latter as overall author. For individual comments on species, the more correct authorship citation would undoubtedly be 'Feldmann, J., in Trochain, J.,' etc.

Turner, D. 1809. *Fuci sive plantarum fucorum generis a botanicis ascriptarum . . .* pls 121 (Vol. II; May 1809) and 147 (Vol. III; October 1809). London.

Umamaheswara Rao, M. 1972. On the Gracilariaceae of the seas around India. *J. mar. biol. Ass. India* **14**: 671–696.

546. **Varo, J., Ramirez, J. & Renteria, J.** 1979. Estudio de la vegetación bentonica del litoral granadino. *Acta bot. malacitana* **5**: 79–98.

547. **Vickers, A.** 1897? ['1896']. Contribution à la flore algologique des Canaries. *Annls Sci. nat.* (Bot.) VIII, **4**: 293–306.

Note. The date is somewhat difficult to cite as there is some confusion regarding the dates of various issues. It does seem possible that pre-prints were issued in 1896; this is the date usually cited (see Lawson & Price, 1969: 345–346).

604. **Viera-Rodriguez, M. A.** 1987. Contribución al estudio de la flórula bentónica de la isla de La Graciosa. Canarias. *Vieraea* **17**: 237–259.

608. —— **& Wildpret de la Torre, W.** 1986. Contribución al estudio de la vegetación bentónica de la isla de La Graciosa. Canarias. *Vieraea* **16**: 211–231.

605. —— **Gil-Rodriguez, M. C., Audiffred, P. A. J., Prud'homme van Reine, W. F., Haroun-Tabraue, R. & Wildpret de la Torre, W.** 1987. Contribución al estudio de la flórula bentónica del islote de Montaña Clara. Canarias. *Vieraea* **17**: 271–279.

548. **Viera y Clavijo, J. de** 1866; 1869. *Diccionario de historia natural de las islas Canarias, . . .* **1** (A–G). Gran Canaria.

Note. The background to this work is explained in detail by Martin Aguado (1957), who outlined (p. 8) the career of Viera y Clavijo and the progress of the work. The MS was completed in 1799, with the title *Diccionario de Historia Natural de las Canarias*, but was not published until the indicated dates. See also references 549 and 386. A further version of the work appeared in 1942 under the 'Publicaciones de la Biblioteca Canaria' series (Tenerife). A more recent (1982) new edition was edited by M. Alvar and included an introduction and appendix, with purely historical/literary data.

551. **Webb, P. B.** 1849. Spicilegia Gorgonea; or a catalogue of all the plants as yet discovered in the Cape de Verd Islands . . . *In* W. J. Hooker, *Niger Flora . . .*: 89–197. London, Paris & Madrid.

553. **Weber-van Bosse, A.** 1921. Liste des algues du Siboga II Rhodophyceae Première partie Protoflorideae, Nemalionales, Cryptonemiales. *In* M. Weber, *Siboga-Expeditie . . . Monographie LIXb. Uitkomsten op Zoologisch, Botanisch, Oceanographisch en Geologisch Gebied. . . . Livr. LXXXIX*: [6] + 187–392 + [4].

556. **Weisscher, F. C. M.** 1983. Marine algae from Selvagem Pequena (Salvage Islands). *Bolm Mus. munic. Funchal* **35**: 41–80.

556A. —— **Audiffred, P. A. J. & Duineveld, G. C. A.** 1982 [15 November 1982]. MS list (in litt.) from Prud'homme van Reine on Netherlands CANCAP Expeditions to the Canaries and Salvage Islands. (See also entry 557.)

557. —— **Prud'homme van Reine, W. F. & Duineveld, G. C. A.** 1985. Marine algal vegetation of Bahia del Confital near Las Palmas de Gran Canaria. Unpublished manuscript [from Prud'homme van Reine] on the findings of the Netherlands CANCAP Expeditions (see entry 556A).

Woelkerling, W. J. 1988. *The coralline red algae: an analysis of the genera and subfamilies of nongeniculate Corallinaceae (Rhodophyta)*. London.

561. **Womersley, H. B. S. & Bailey, A.** 1970. Marine algae of the Solomon Islands. *Phil. Trans. R. Soc.* B, **259**: 257–352.

36B. **Wynne, M. J.** 1986. Report on a collection of benthic marine algae from the Namibian coast (southwestern Africa). *Nova Hedwigia* **43**: 311–355.

—— 1986. A checklist of benthic marine algae of the tropical and subtropical western Atlantic. *Can. J. Bot.* **64**: 2239–2281.

566. See **Zaneveld, J. S.** 1956.

567. See **Lüning, K.** 1985.

570. See **Seagrief, S. C.** 1984.

571. **Xia, B. & Abbott, I. A.** 1985. The genus *Polycavernosa* Chang et Xia (Gracilariaceae, Rhodophyta): a comparison with *Gracilaria* Grev., and a key to the species [pp. 157–162]. *In* I. A. Abbott & J. N. Norris (Eds), *Taxonomy of economic seaweeds With reference to some Pacific and Caribbean species*. La Jolla, California.

572. See **Chang, C. F. & Xia, B. M.** 1963.

574. See **Seoane-Camba, J.** 1977.

575. See **Fan, K.-C. & Papenfuss, G. F.** 1959.

576. See **Afonso-Carrillo, J.** 1985.

577. See **Riouall, R. et al.** 1985.

578. See **Gepp, A. & Gepp, E. S.** 1912.

579. See **Carter, A. R. & Anderson, R. J.** 1986.

581. See **Cardell Cristellys, E. et al.** 1977.

582. See **Afonso-Carrillo, J. et al.** 1985.

583. See **Haroun Tabraue, R. J. et al.** 1985.

584. See **Ribera Siguán, M. A. et al.** 1985.

585. See **Abbott, I. A.** 1962.

586. See **Lawson, G. W. & John, D. M.** 1987.

588. See **Ardré. F. & Gayral, P.** 1961.

589. See **Guiry, M. D.** 1984.

590. See **John, D. M. & Lawson, G. W.** (unpublished).

592. See **Bird, C. J. & Oliveira filho, E. C. de** 1986.

593. See **McLachlan, J. & Bird, C. J.** 1986.

594. See **Lawson, G. W.** 1954.

596. See **Bailey, J. W. & Harvey, W. H.** 1862.

597. See **Prud'homme van Reine, W. F. & Lobin, W.** 1986.

598. See **Prud'homme van Reine, W. F.** (*in litt.* 10/4/87).

599. See **Stegenga, H.** 1986.

600. **Xia, B. & Abbott, I. A.** 1987. New species of *Polycavernosa* Chang & Xia (Gracilariaceae, Rhodophyta) from the western Pacific. *Phycologia* **26**: 405–418.
604. See **Viera-Rodriguez, M. A.** 1987.
605. See **Viera-Rodriguez, M. A. et al.** 1987.
608. See **Viera-Rodriguez, M. A. & Wildpret de la Torre, W.** 1986.
609. **Yamamoto, H.** 1978. Systematic and anatomical study of the genus *Gracilaria* in Japan. *Mem. fac. Fish., Hokkaido Univ.* **25**: 97–152.
566. **Zaneveld, J. S.** 1956. Economic marine algae of tropical south and east Asia and their utilisation. *Indo-Pacific Fisheries Council, Serial publications* No. **3**: [2] + 1–55.
610. See **Gonzalez, N.** 1979.
611. See **John, D. M. & Lawson, G. W.** 1988.
612. See **Rotmann, K. W. G.** 1987.
614. See **Maggs, C. A. & Guiry, M. D.** 1988.

British Museum (Natural History)

MACROLICHENS OF EAST AFRICA

T. D. V. Swinscow and H. Krog

Dr Swinscow was formerly Deputy Editor of the British Medical Journal.
Dr Krog is Professor of Taxonomic Botany at the University of Oslo.

This book is based mainly on collections made in the field by the authors. It covers 77 genera and 629 species. It is the first substantial study of a tropical lichen flora to be undertaken by modern research methods. Thin-layer chromatography has been used throughout, and the great majority of species have been studied by microscopic examination of microtome sections. The nomenclature has been thoroughly revised, and in all cases the basionym is given. The book will be indispensable to students of the lichens of the African continent and valuable to readers interested in lichens throughout the tropics.

Summer 1988, viii + 384pp, 185 figs., 16pp colour illustrations.
Hardback. 0 565 01039 5. £20.00

Titles to be published in Volume 18

An illustrated catalogue of the type specimens in the Greville diatom herbarium
By David M. Williams

Erik Acharius and his influence on English lichenology
By David J. Galloway

Seaweeds of the western coast of tropical Africa and adjacent islands: a critical assessment. IV. Rhodophyta (Florideae) 2. Genera G
By James H. Price, David M. John and George W. Lawson

A monograph of *Dryopteris* (Pteridophyta: Dryopteridaceae) in the Indian subcontinent
By Christopher R. Fraser-Jenkins

Some Cretaceous and Paleogene *Trinacria* (diatom) species
By Patricia A. Sims and Robert Ross

***Corydalis* (Papaveraceae: Fumarioideae) in Nepal**
By Magnus Lidén.

Photoset by Rowland Phototypesetting Ltd, Bury St Edmunds, Suffolk
Printed in Great Britain by Henry Ling Ltd, Dorchester